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FIG. 1A

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108-1064SA000

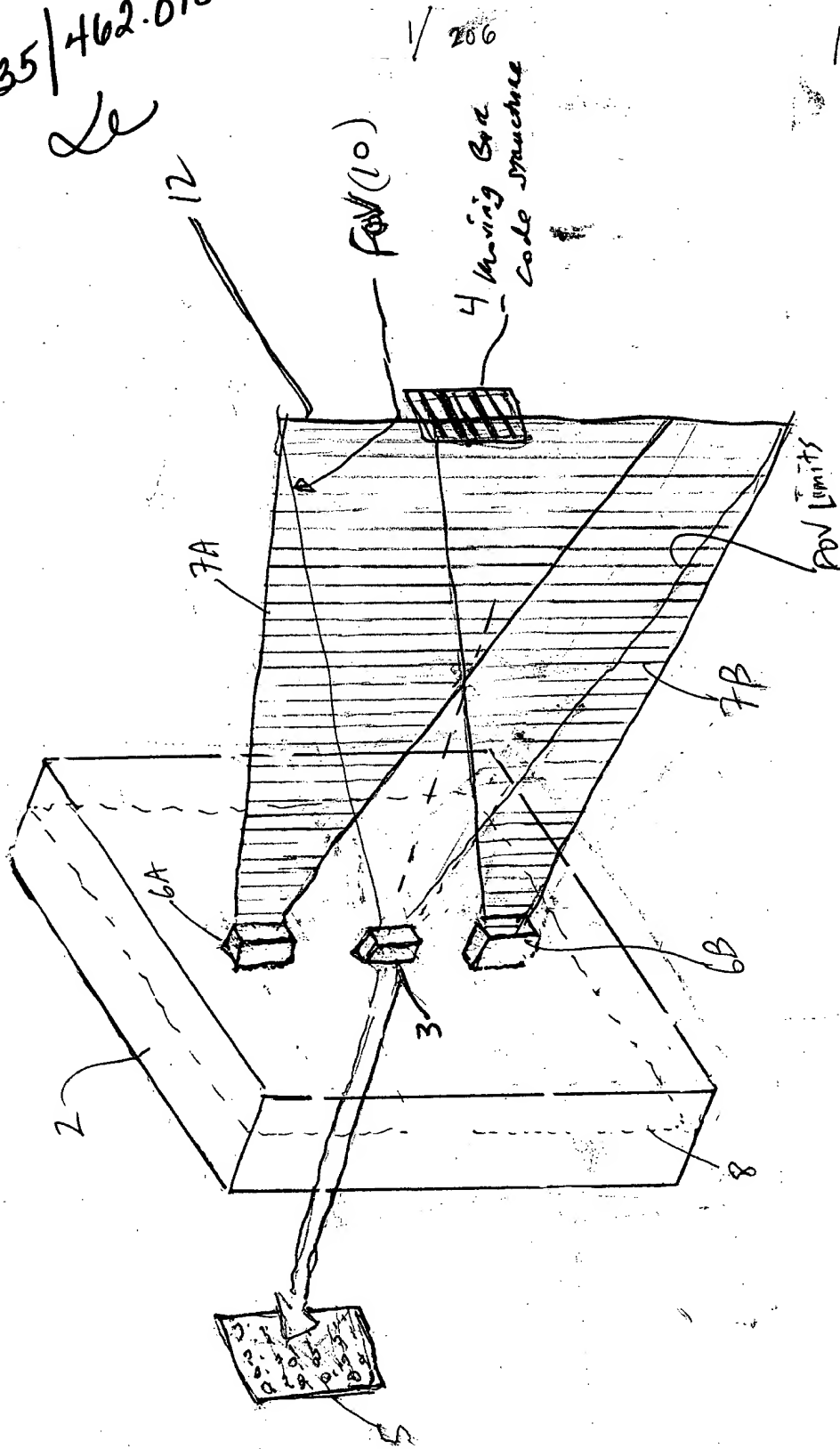


FIG. 1A

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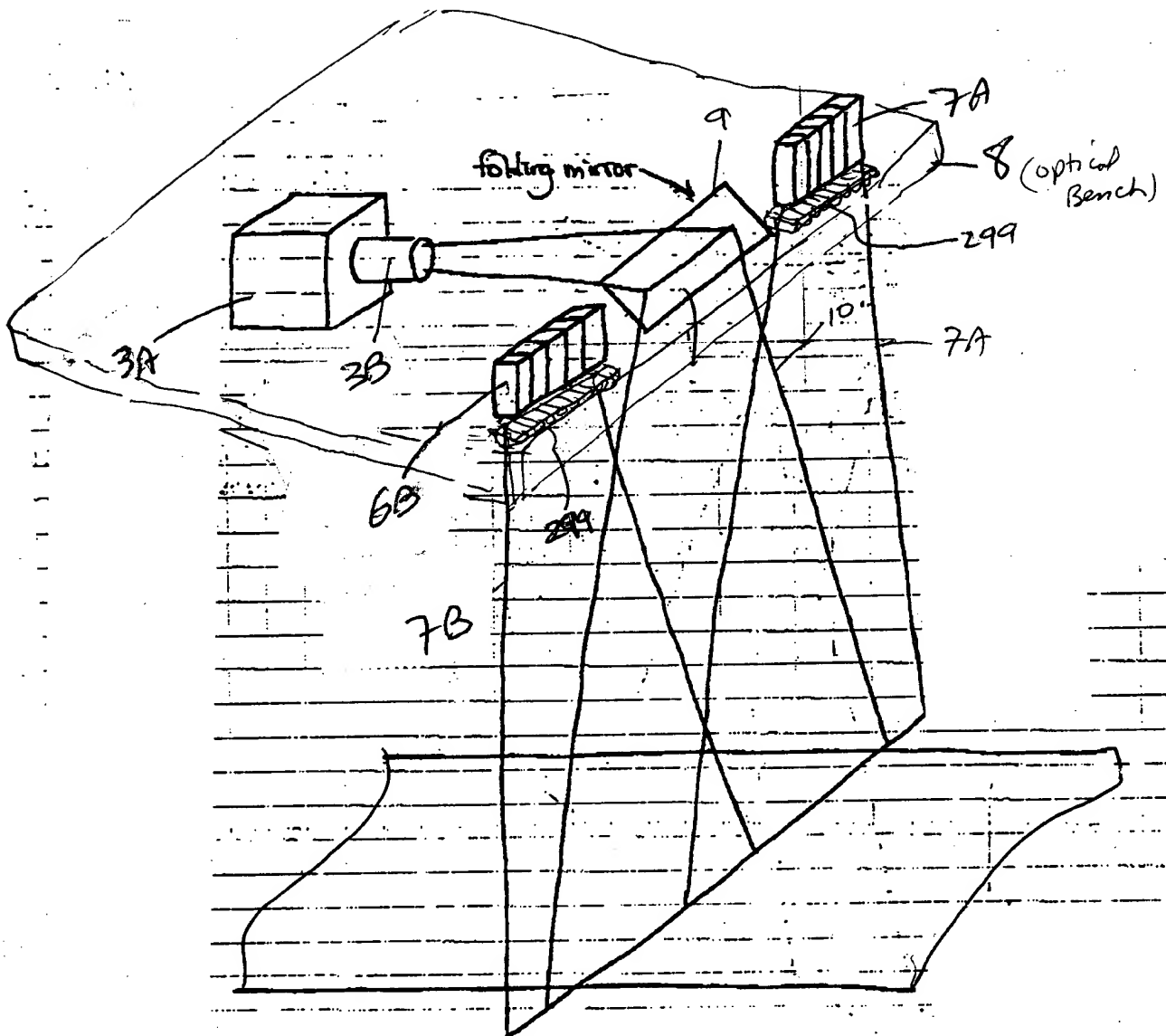


FIG. 1B1

1A

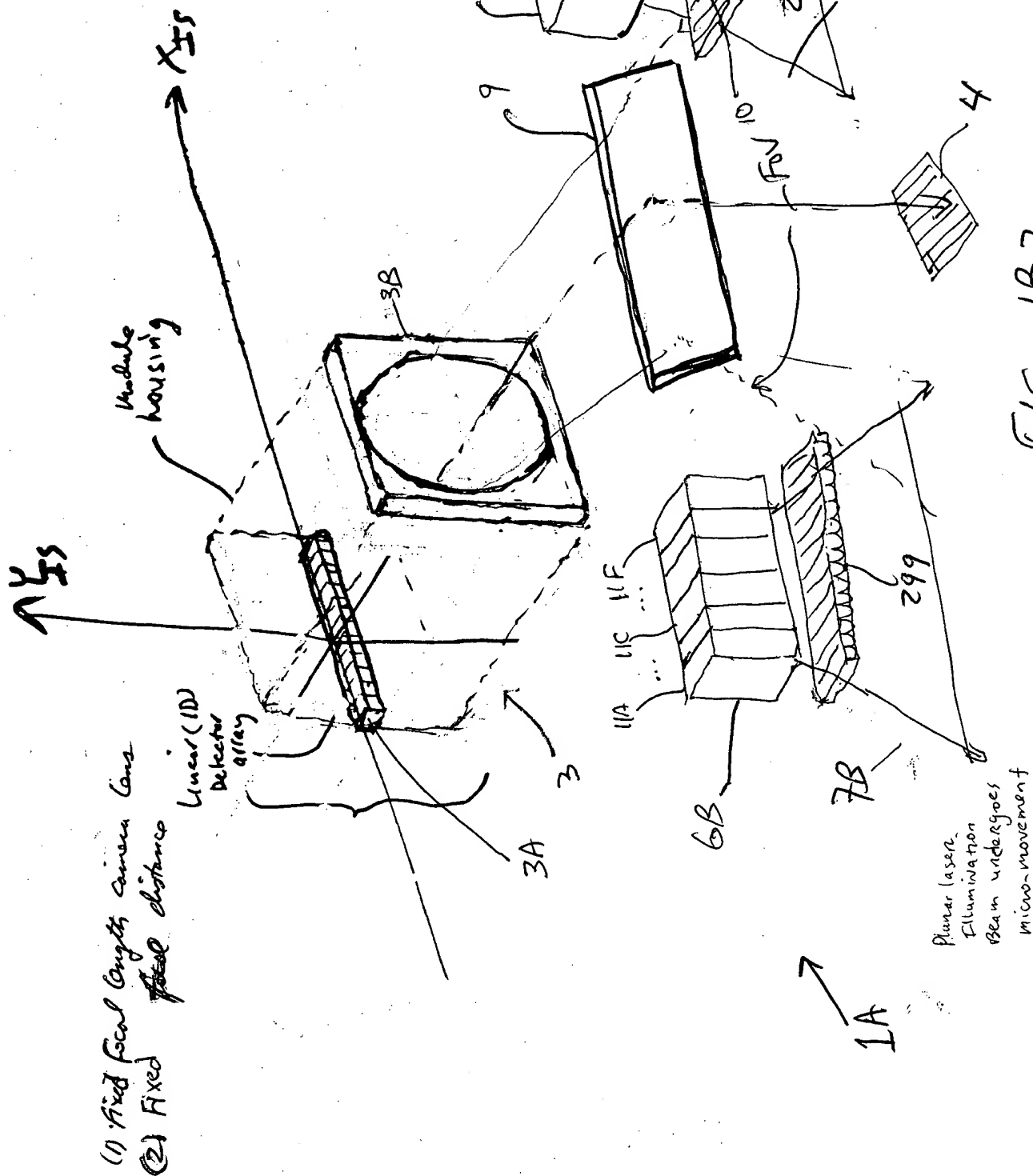


FIG. 1B2



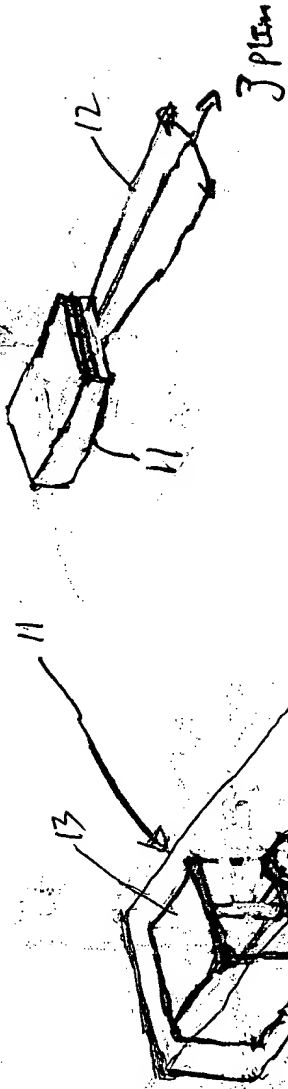


FIG. 1C

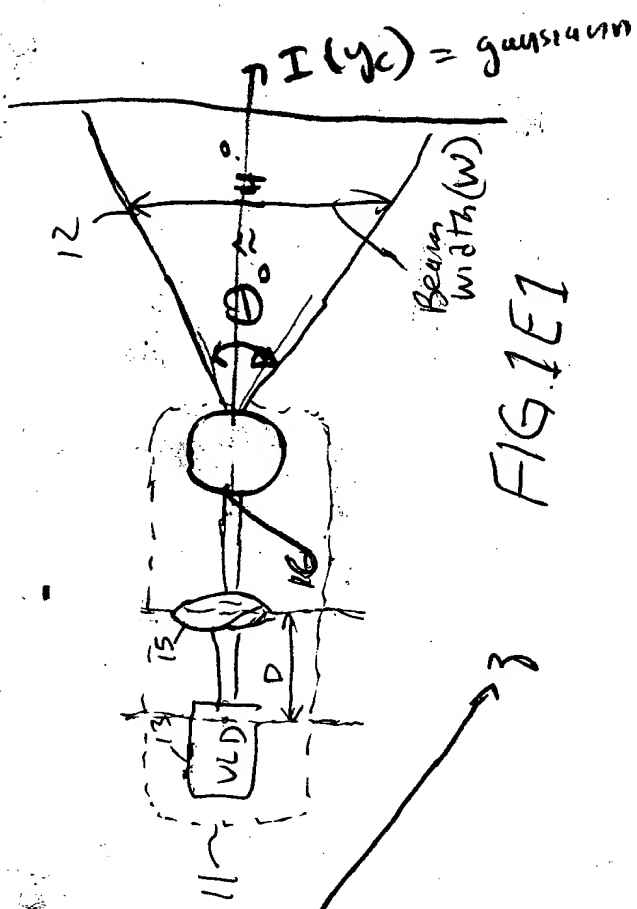


FIG. 1E1

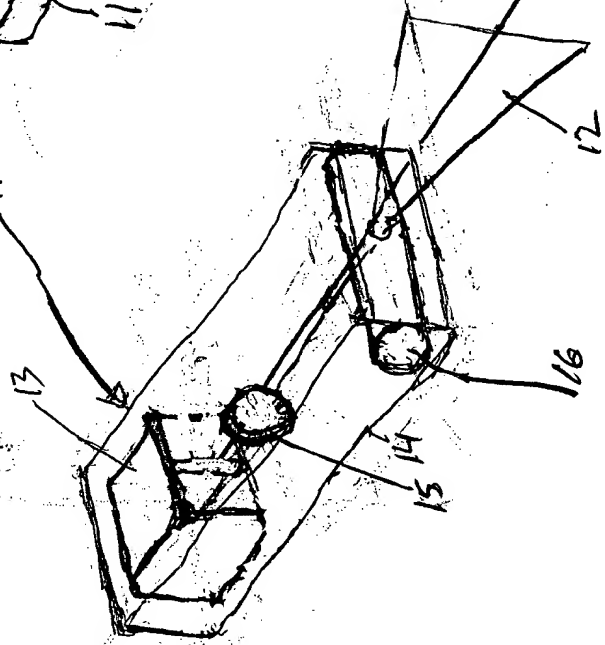


FIG. 1D

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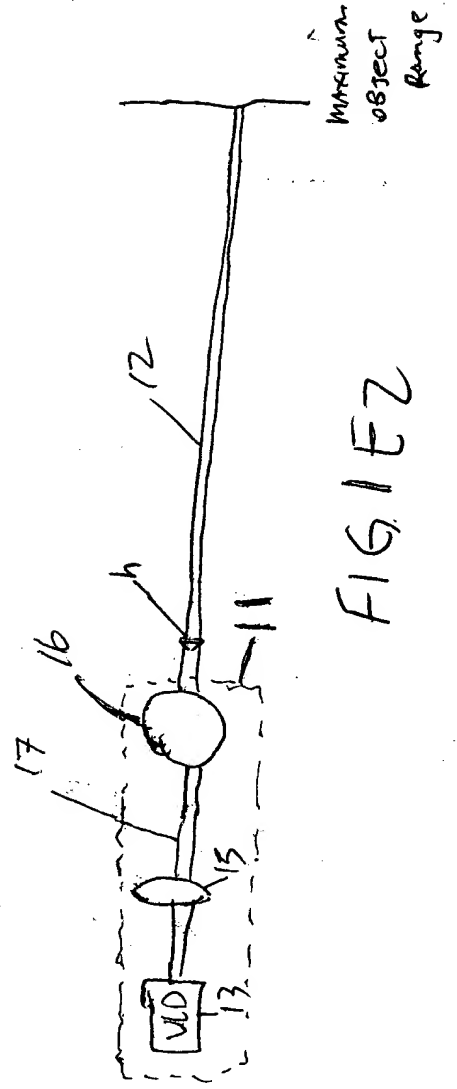


FIG. 1E2

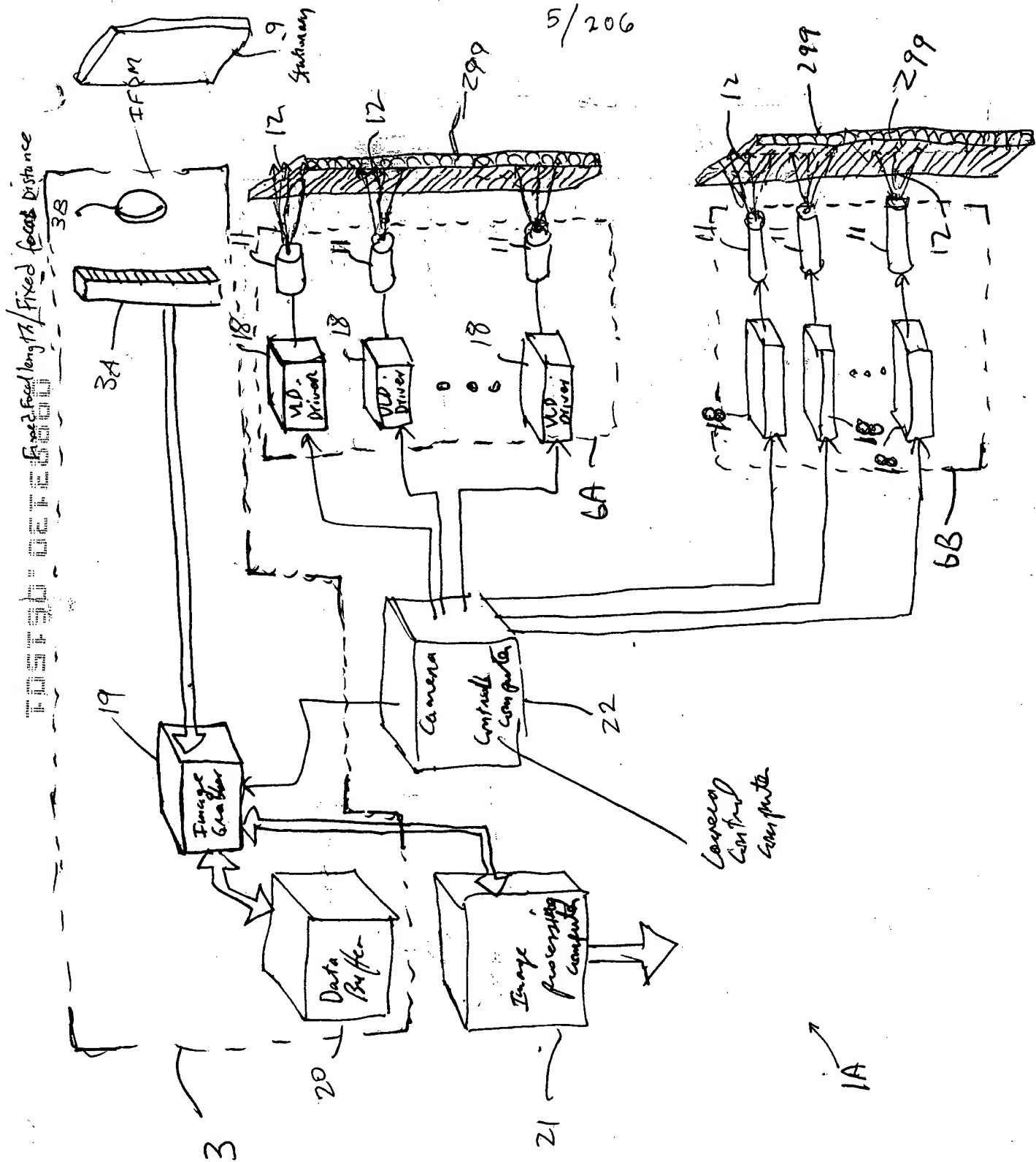


FIG. 1F

[illegible]

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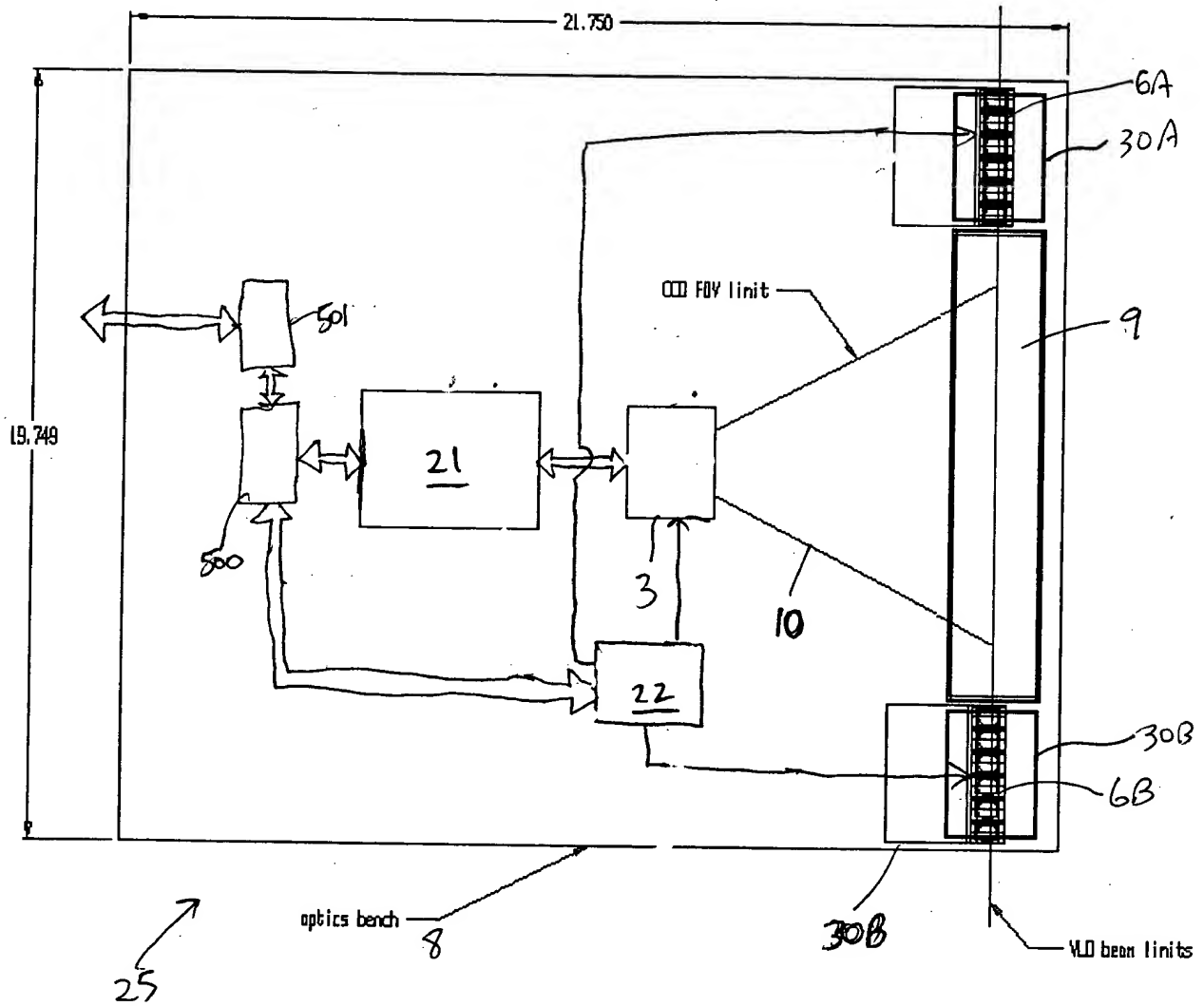


FIG. 1G2

FOV 90° DETECTOR

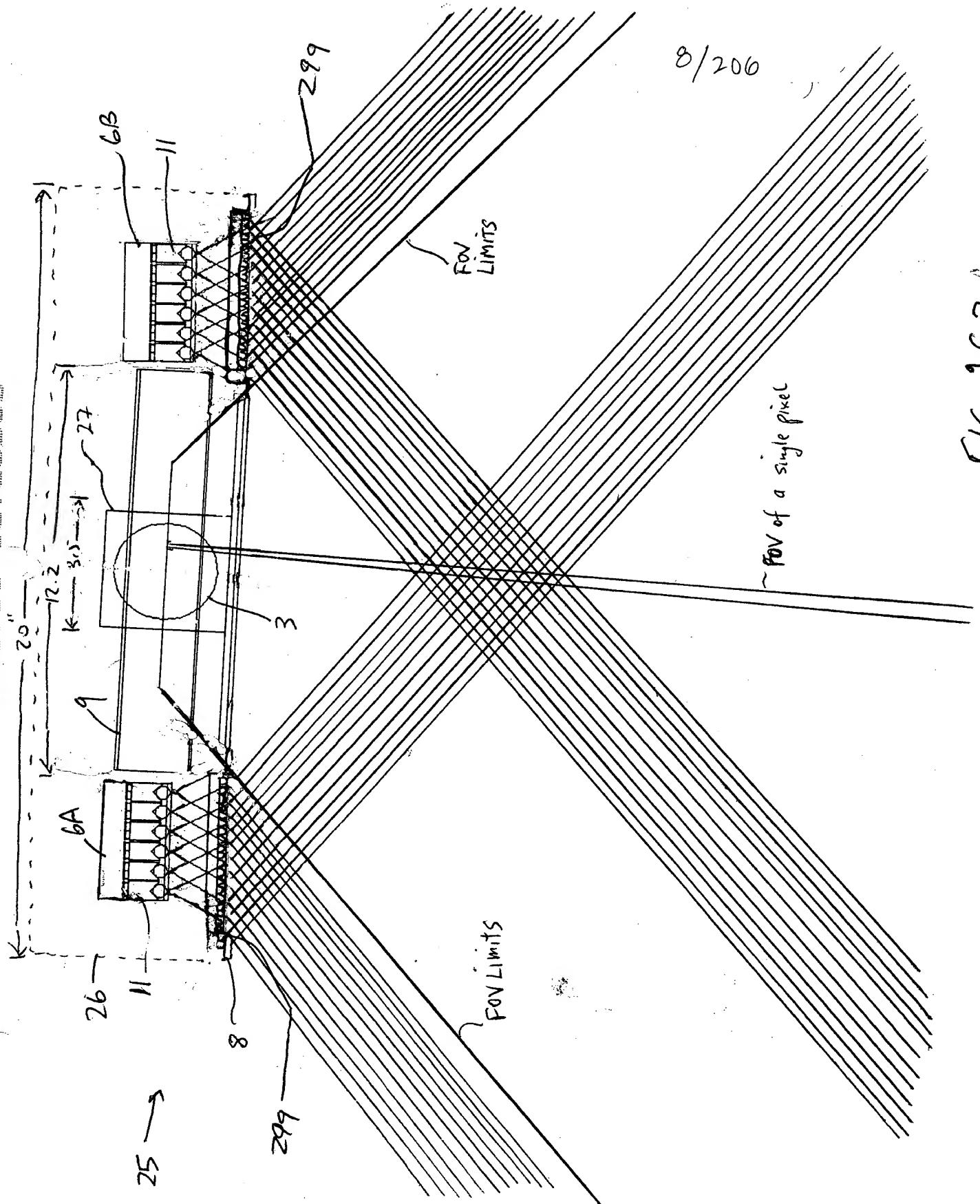


FIG. 1G3

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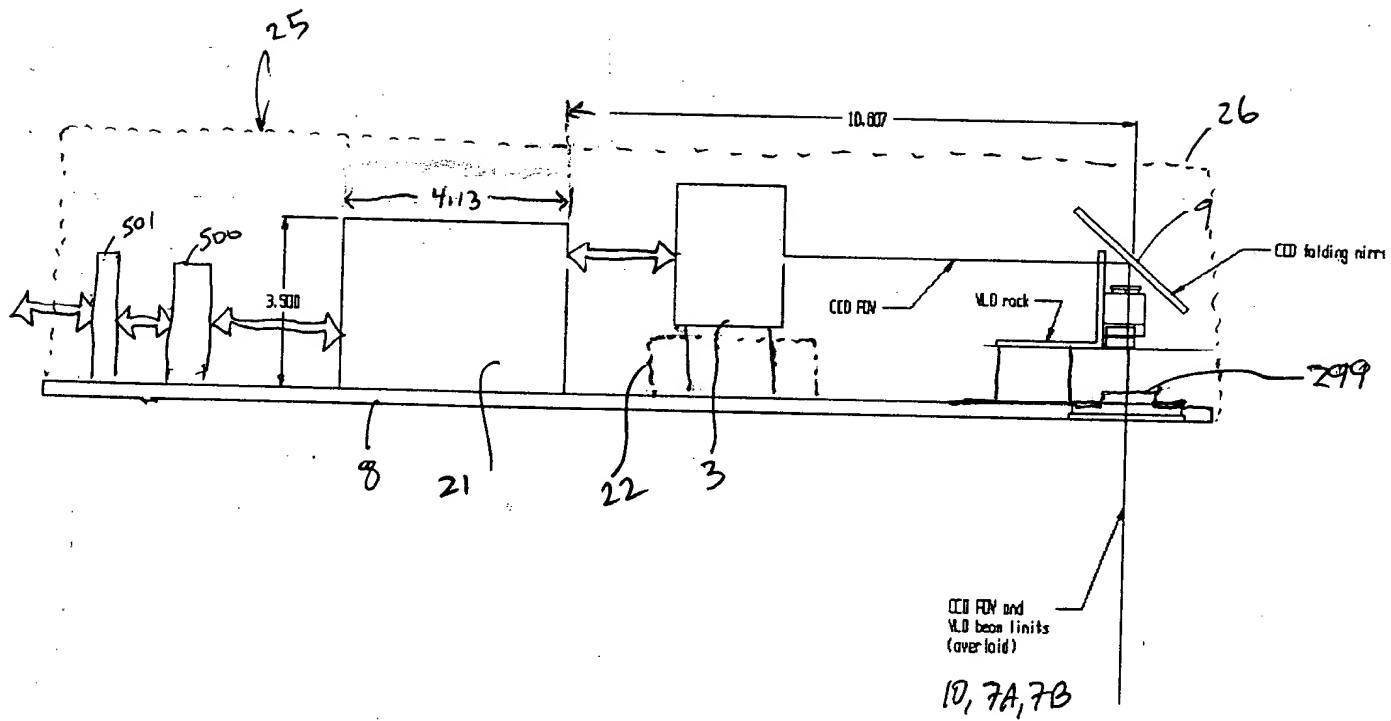
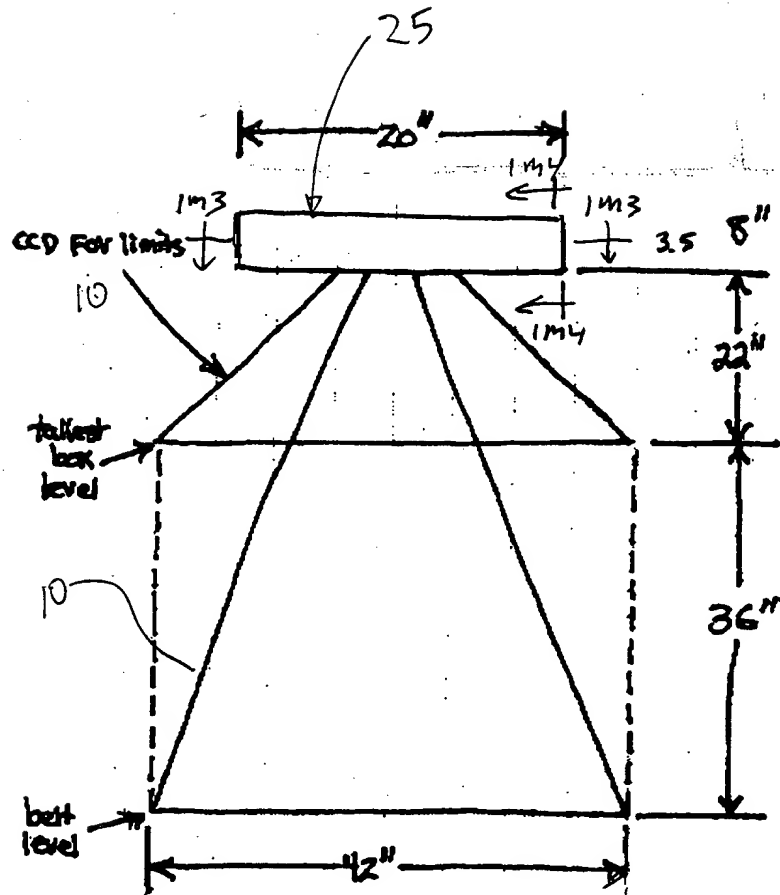


FIG. 164

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\* Fixed Field of Field

FIG. 1G5

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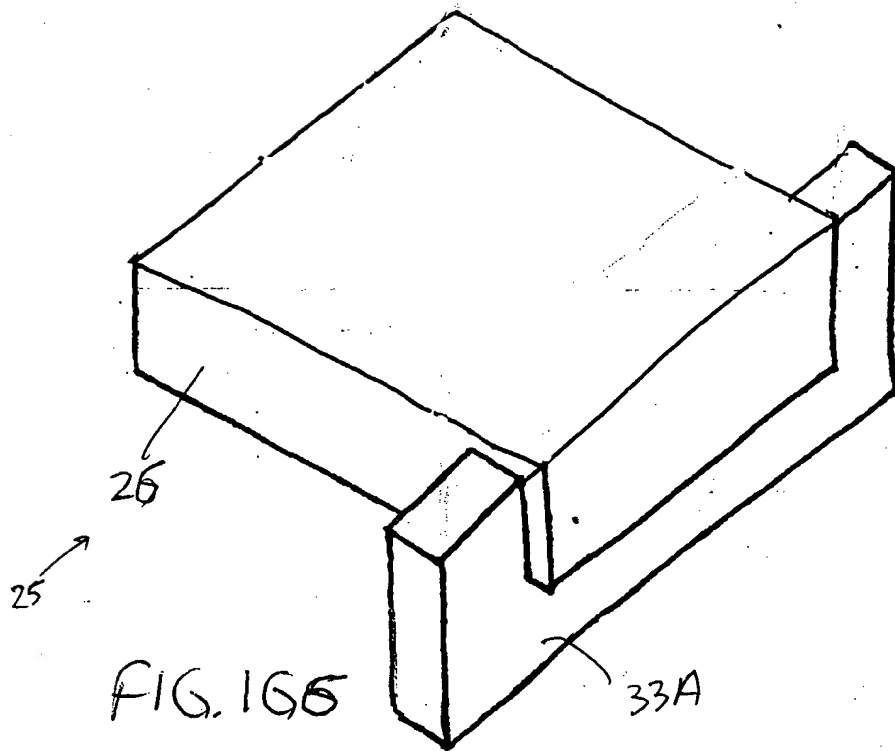


FIG. 166

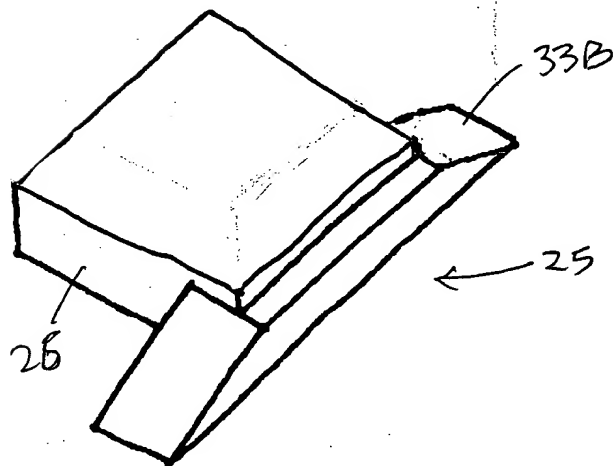


FIG. 167



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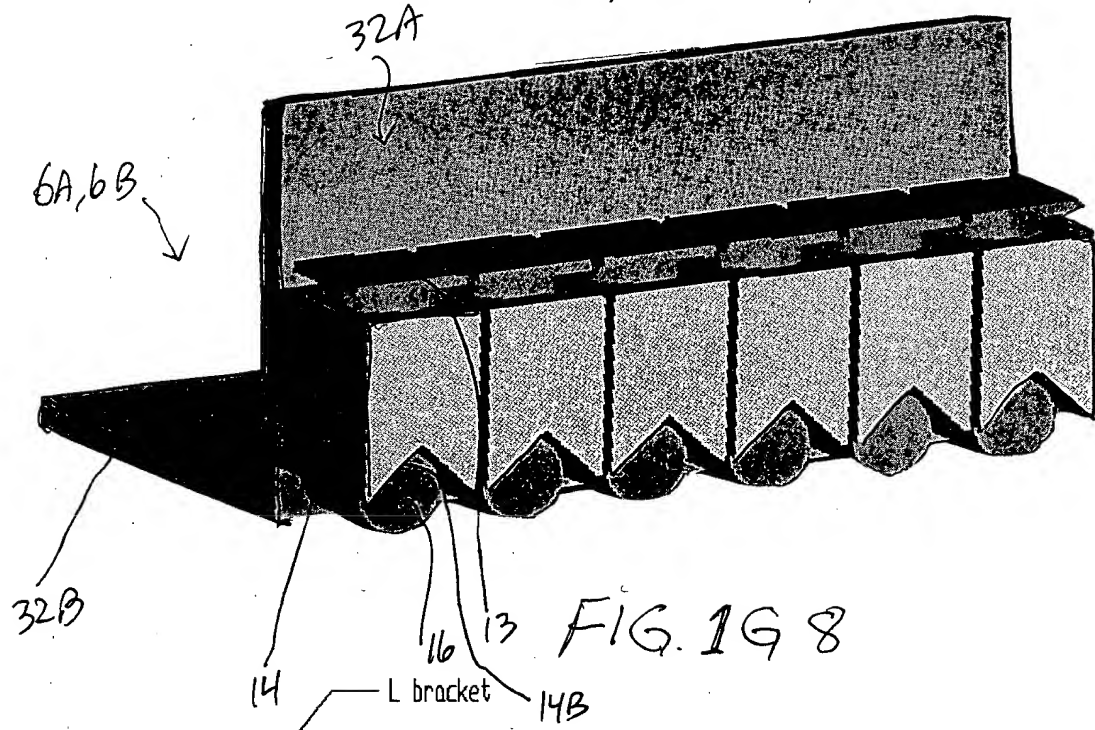


FIG. 1G 8

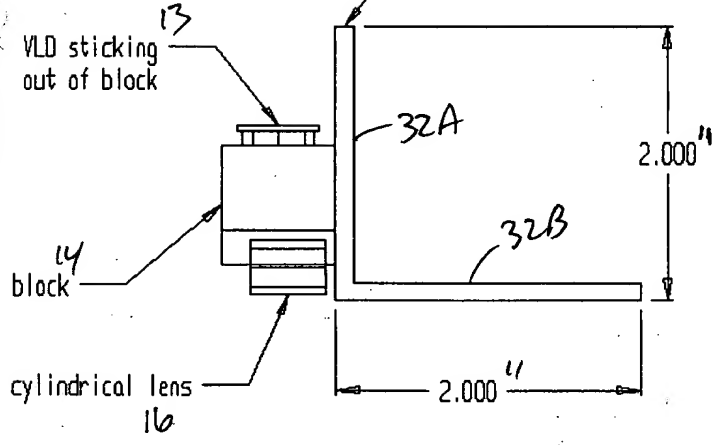


FIG. 1G.9

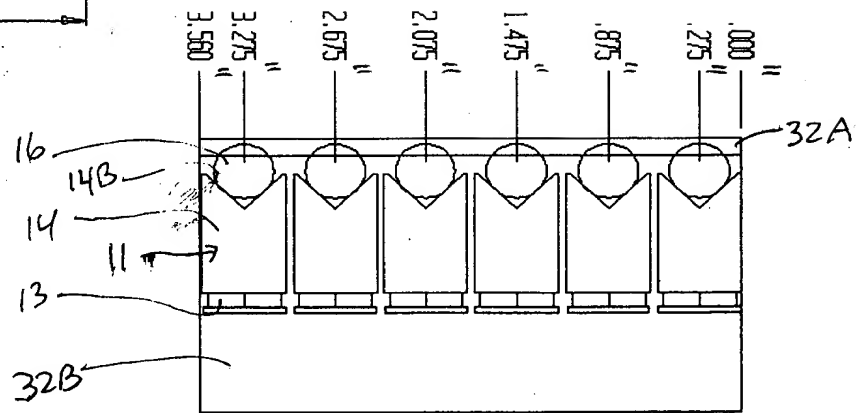


FIG. 1G10

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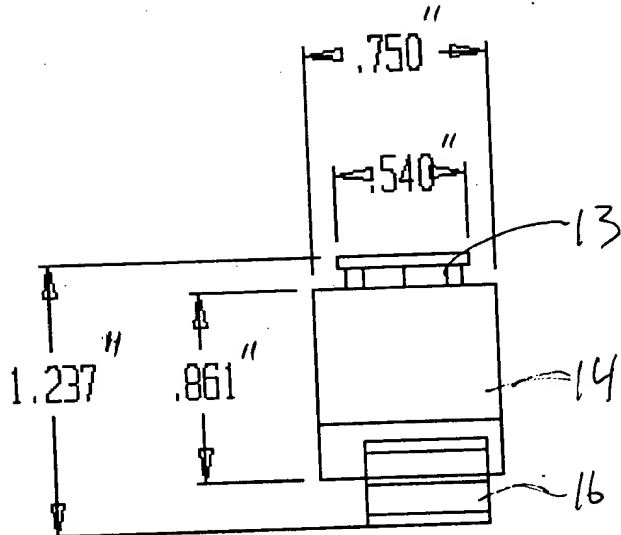


FIG. 1G11

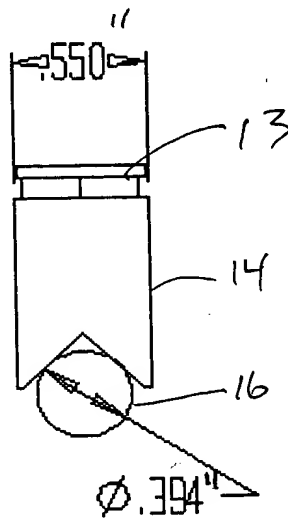


FIG. 1G12

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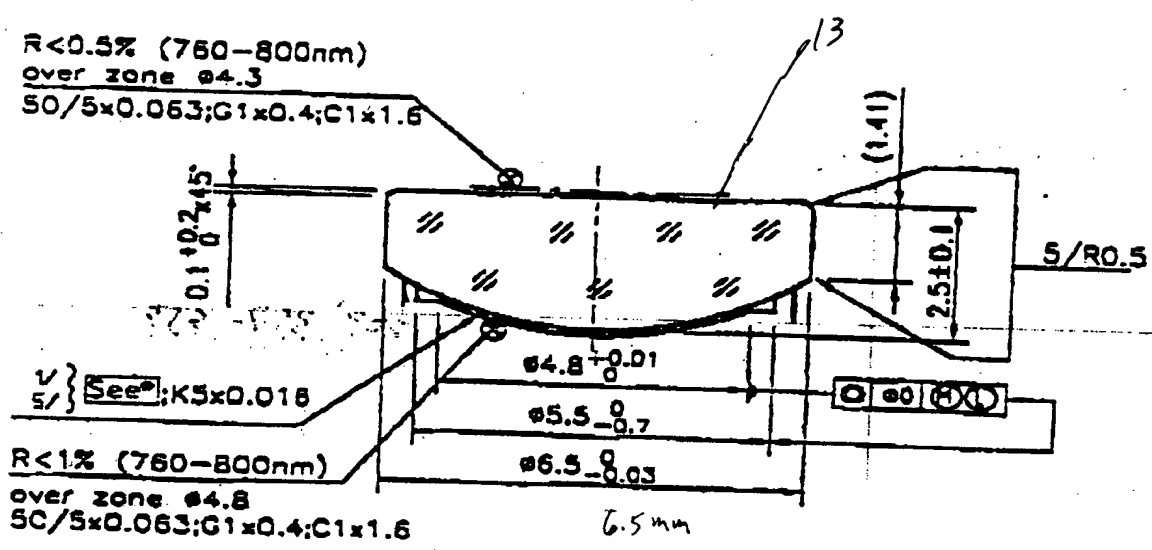


FIG. 1G13

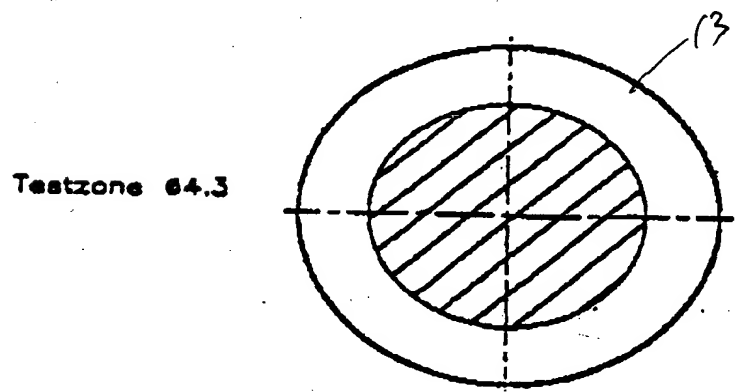


FIG. 1G14

105750-001-000000

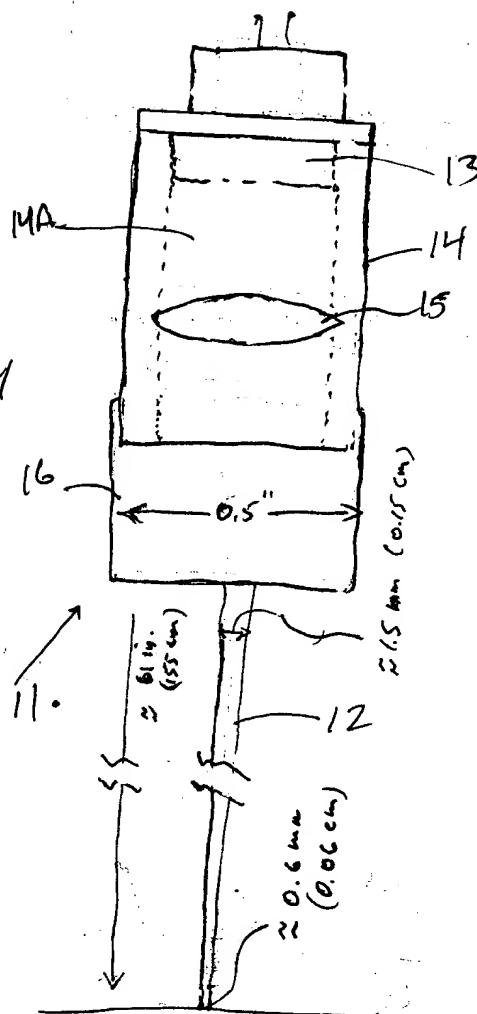
[illegible]

FIG. 1615B

furthest  
object / working  
distance

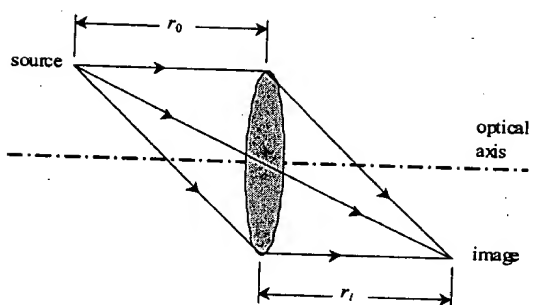


FIG. 141

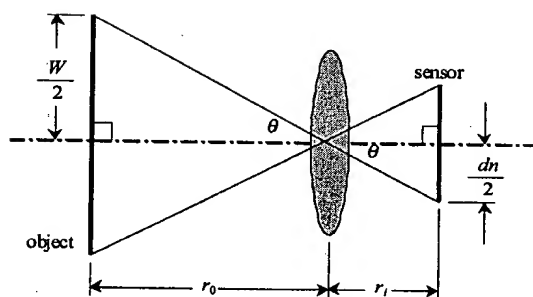


FIG. 1H2

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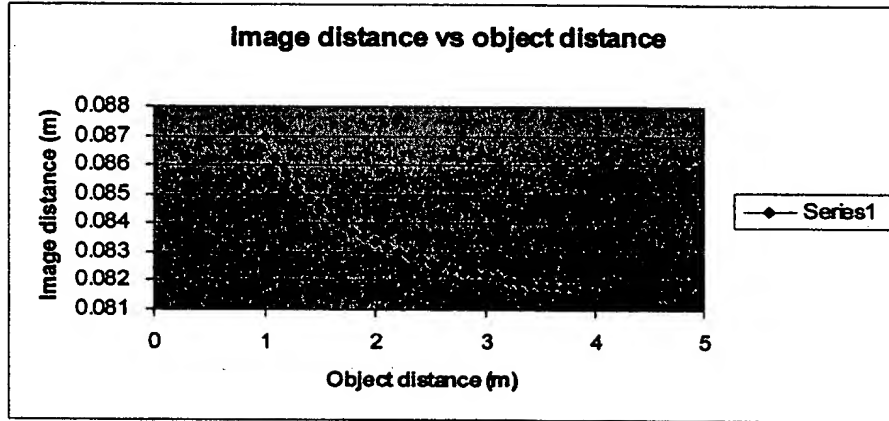


FIG. 1H3

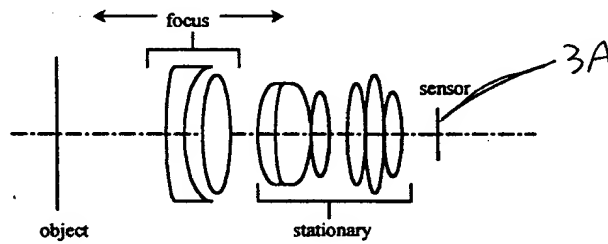


FIG. 1H4

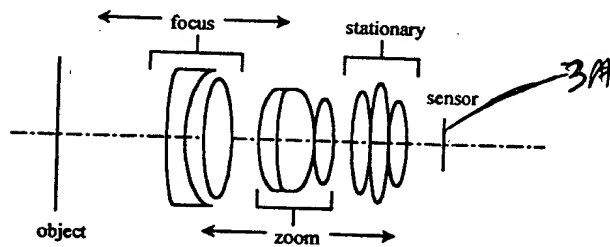
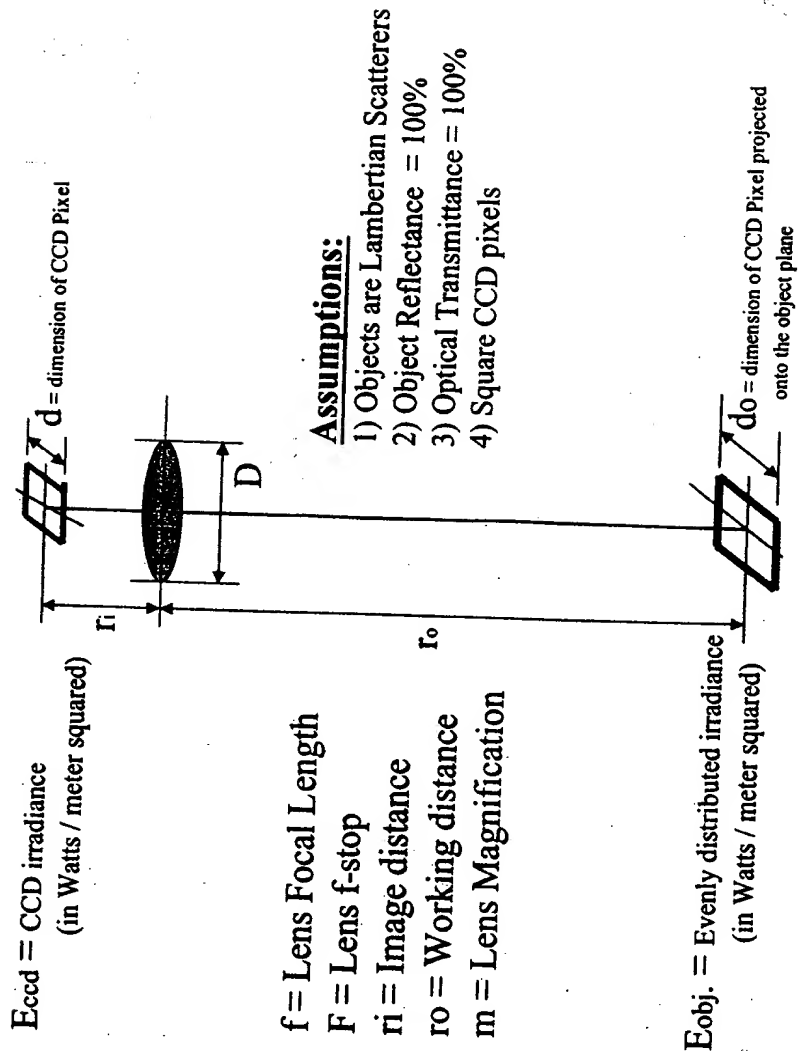


FIG. 1H5

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CCD-Based Scanner

FIG. 1H6

FIRST GENERALIZED METHOD  
of Reducing Speckle-Noise  
PATTERNS AT IMAGE  
DETECTION array OF THE  
FPD subsystem (3)

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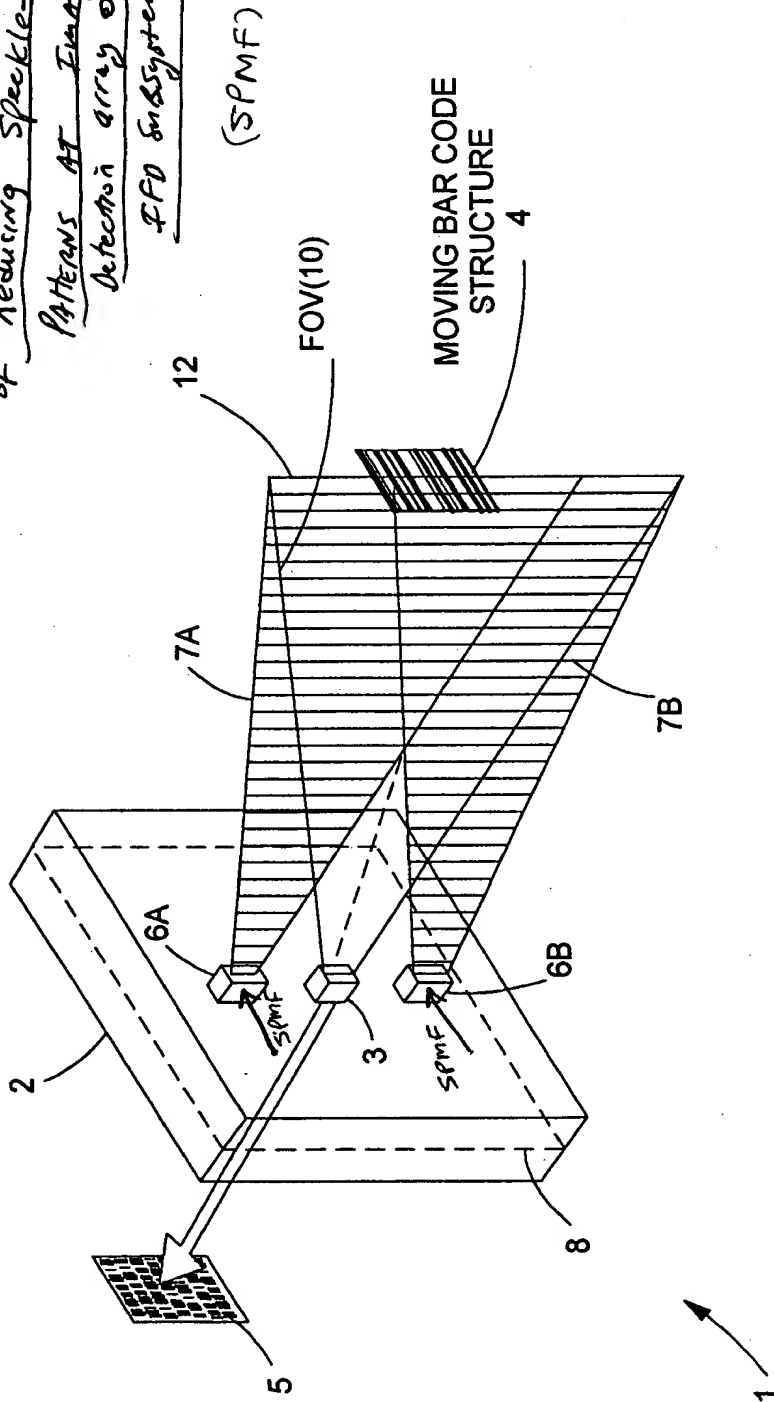


FIG. 1I1





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**The First Generalized Speckle-Noise Pattern Reduction Method**  
**Of The Present Invention**

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial phase of the transmitted PLIB along the planar extent thereof according to a spatial phase modulation function (SPMF) so as to modulate the phase along the wavefront of the transmitted PLIB and produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

↓

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the power of the speckle-noise pattern observed at the image detection array.

FIG. 1I2B

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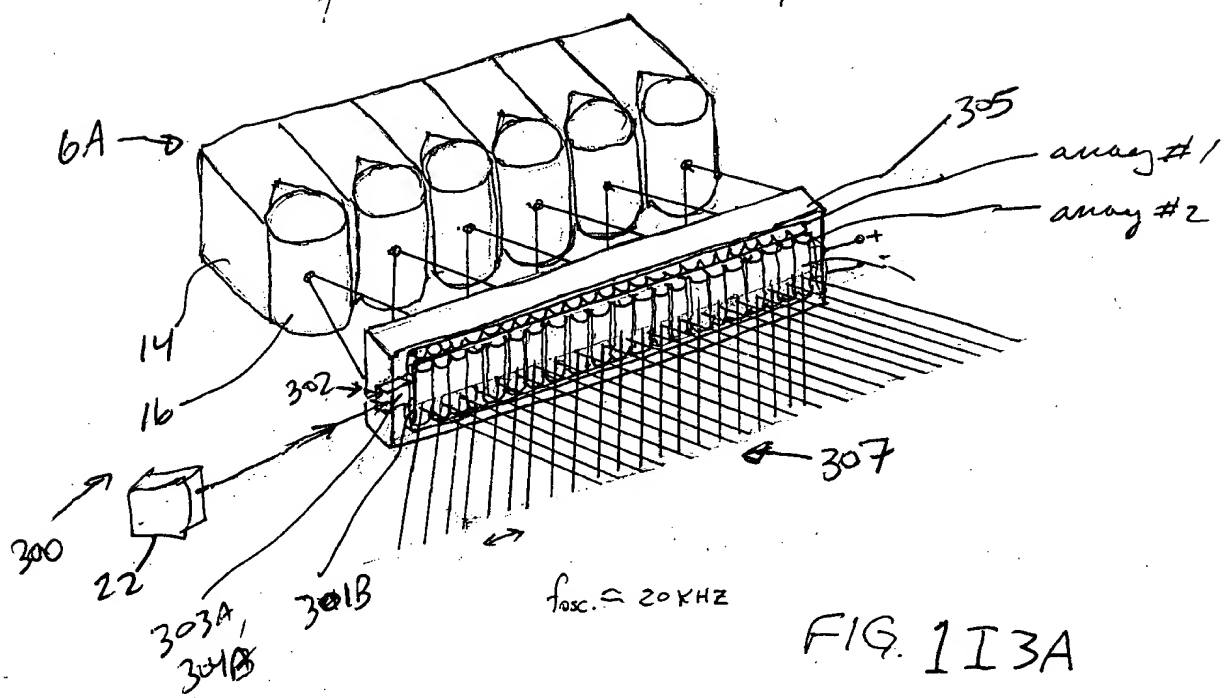


FIG. 1I3A

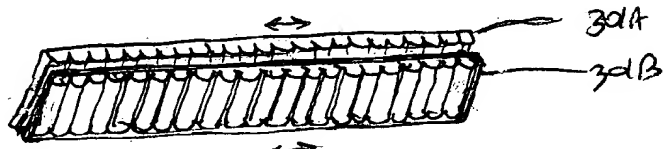


FIG. 1I3B

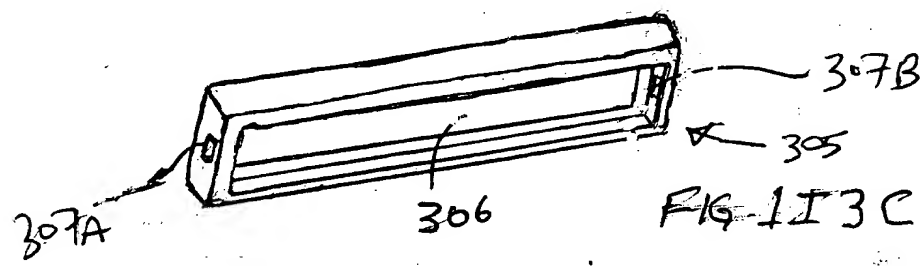


FIG. 1I3C

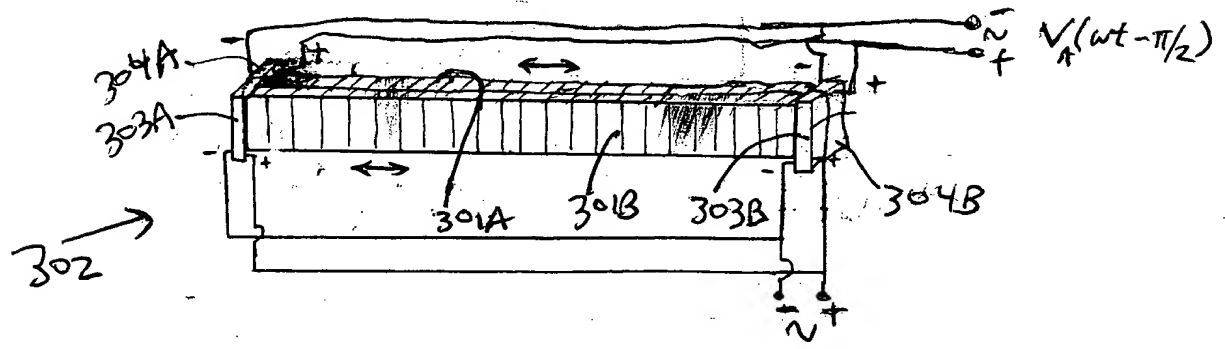


FIG. 1I3D

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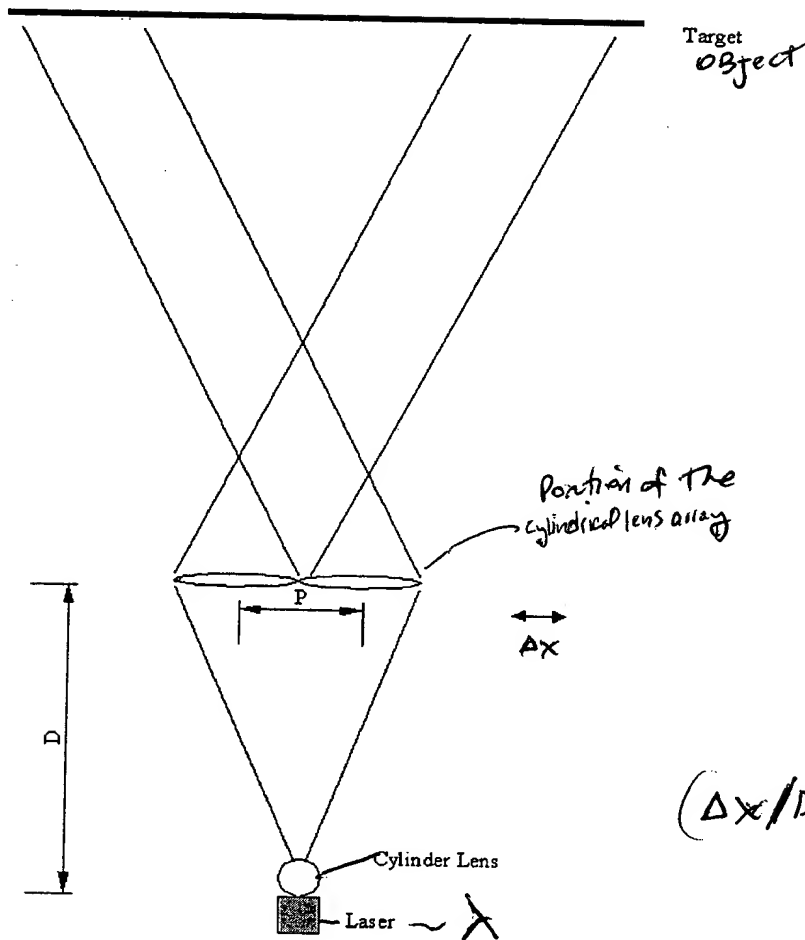


Figure 1

$$(\Delta x / D) P = \lambda$$

$$\Delta x \geq \frac{\lambda \cdot D}{P}$$

FIG. 1I3E

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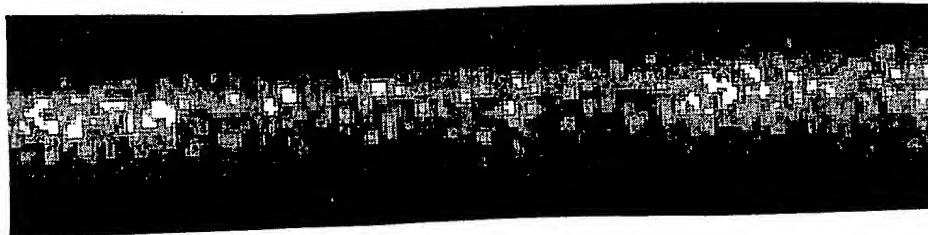


FIG. 1I3F

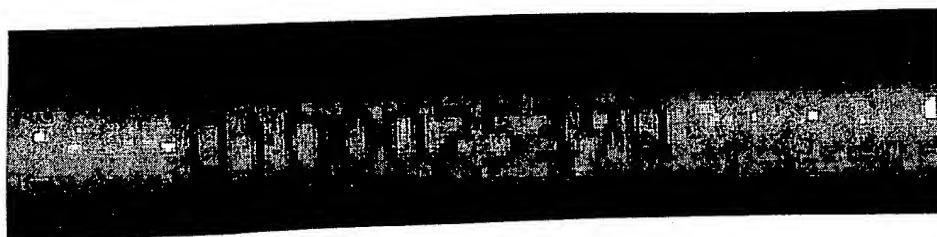
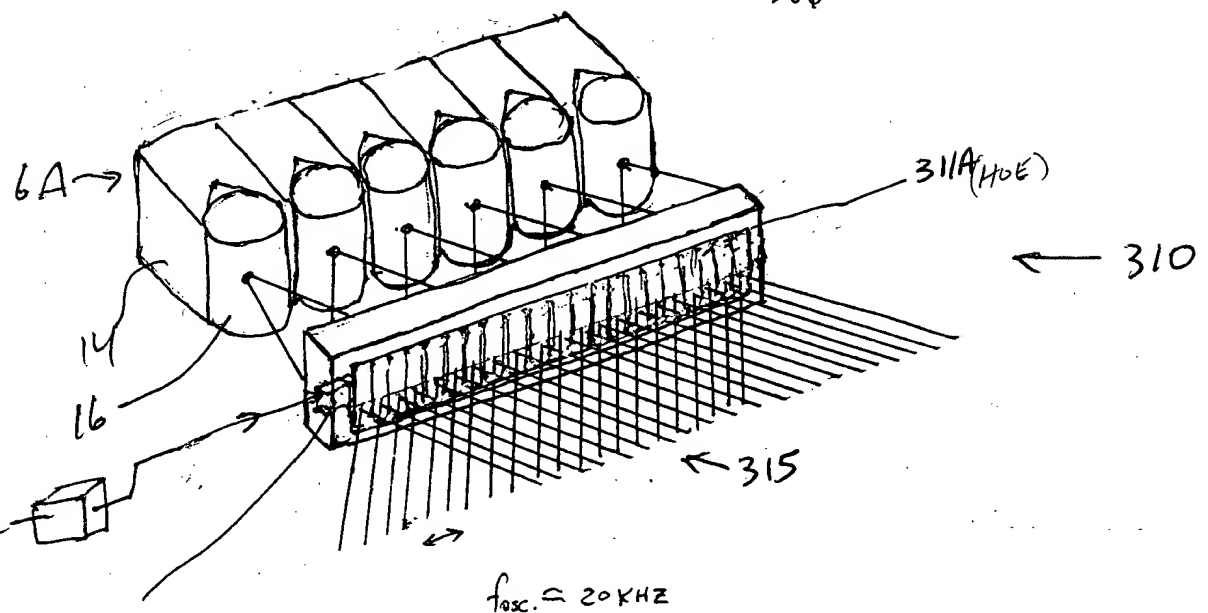


FIG 1I3G

00000130-054504

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$f_{osc} = 20 \text{ KHZ}$

FIG 1I4A

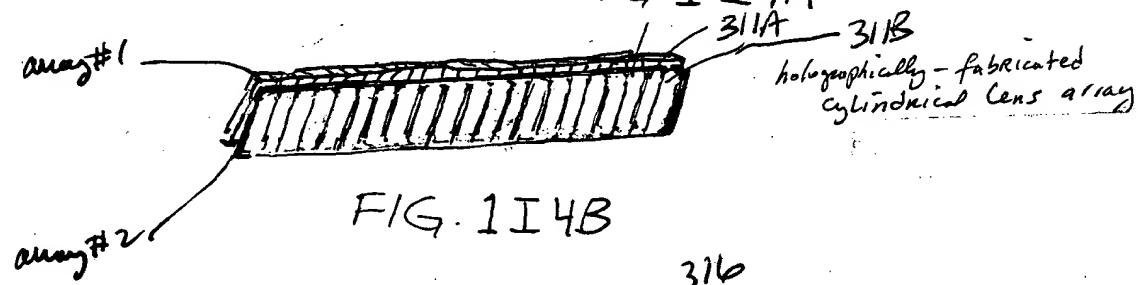


FIG. 1I4B

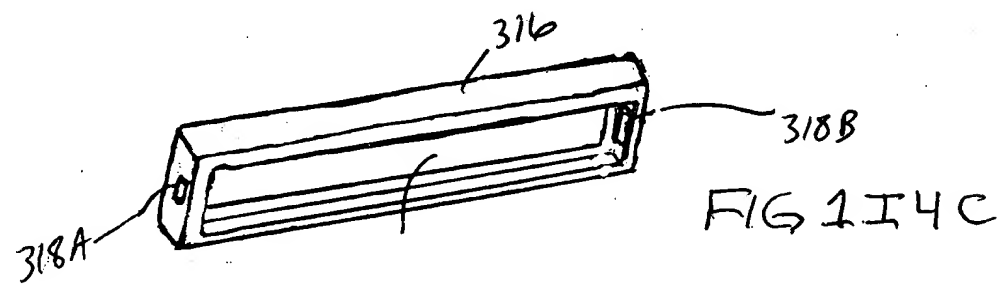


FIG 1I4C

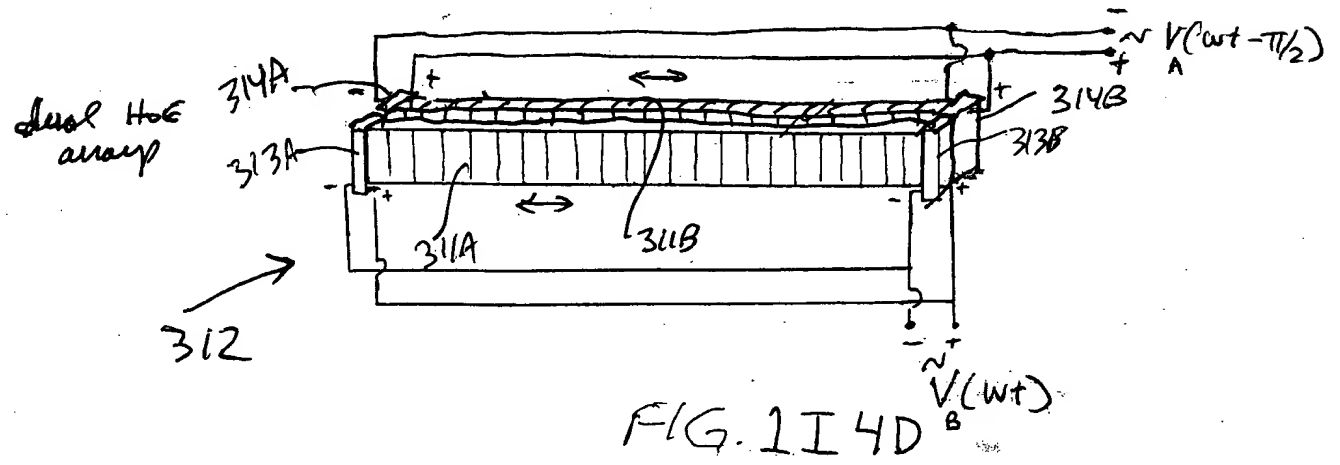


FIG. 1I4D

00000130-061501

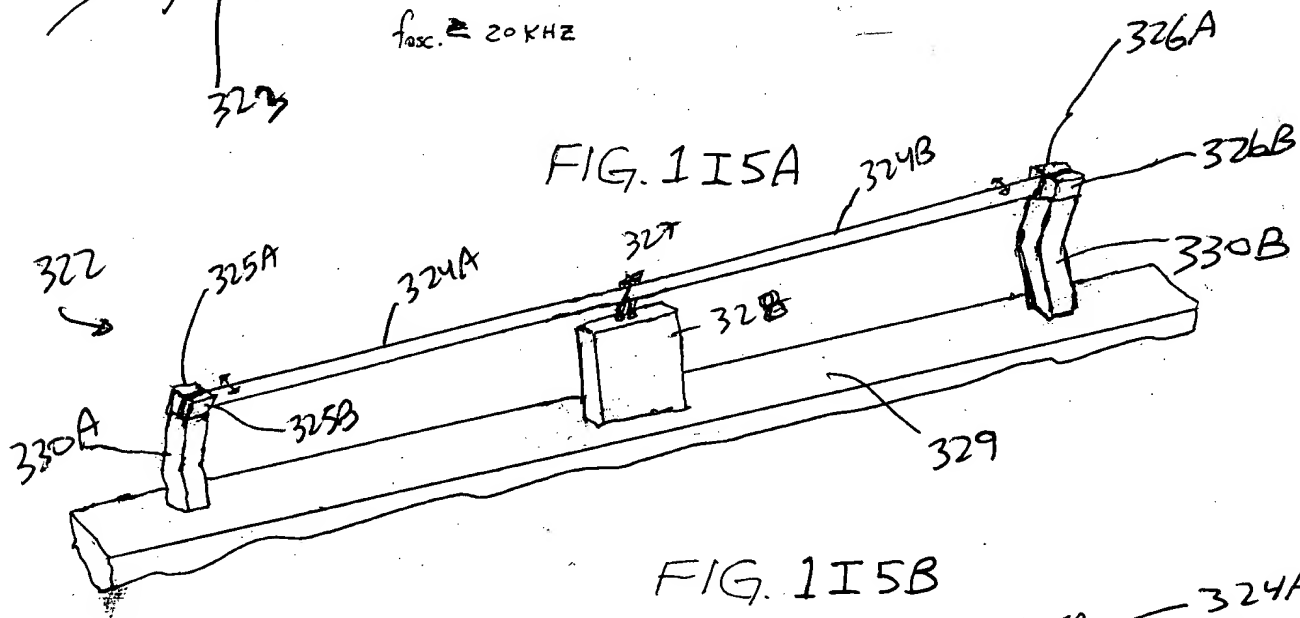
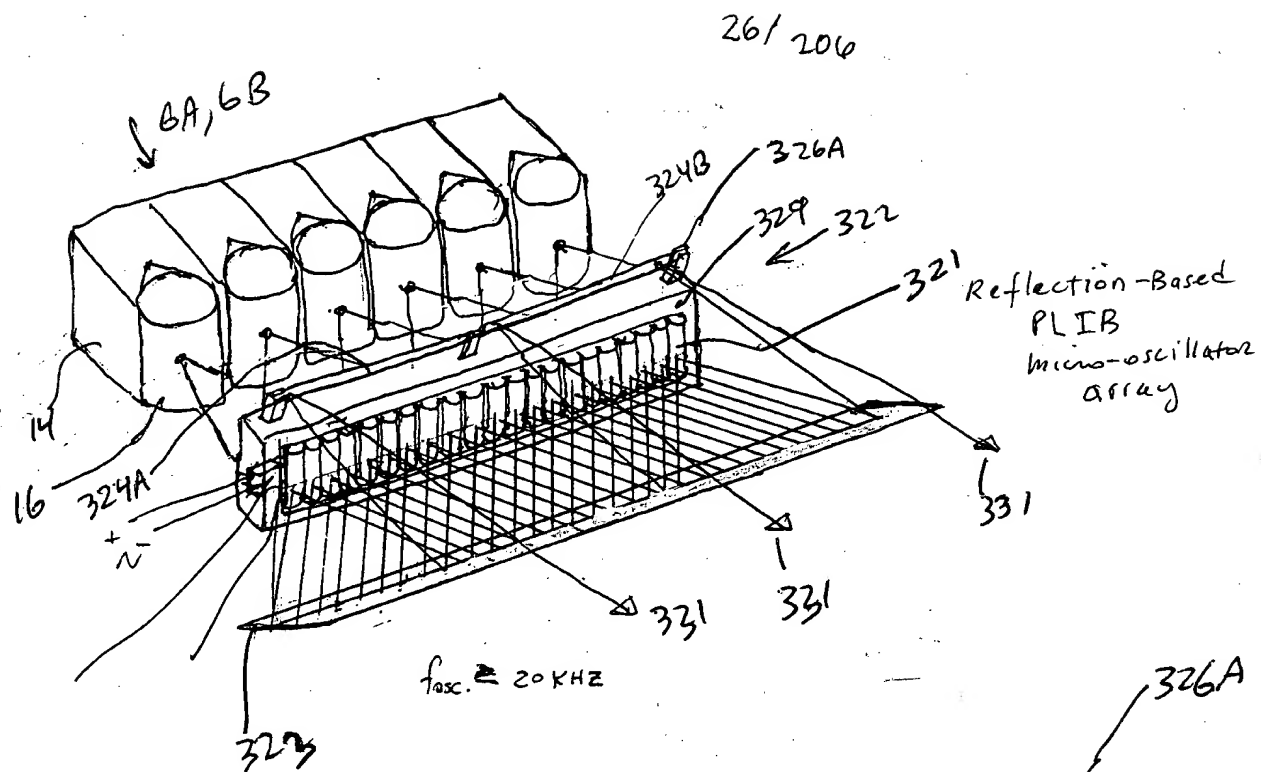
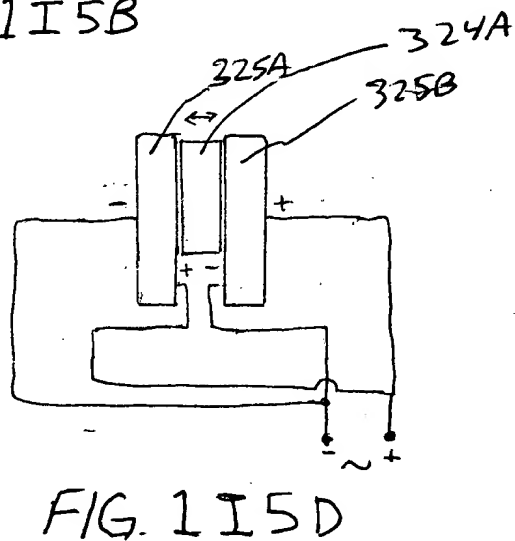
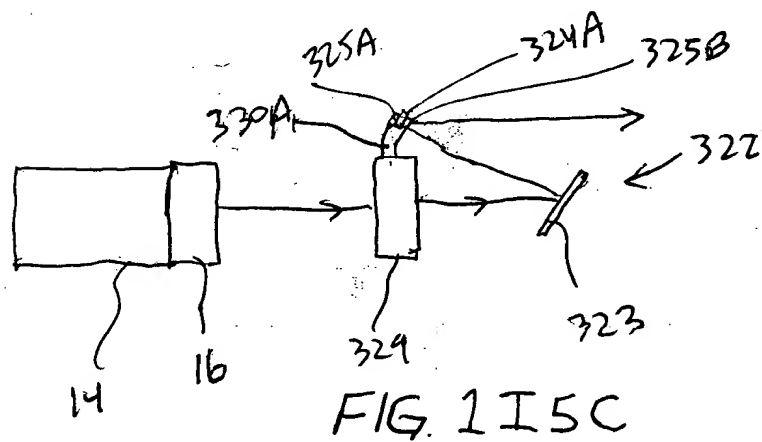
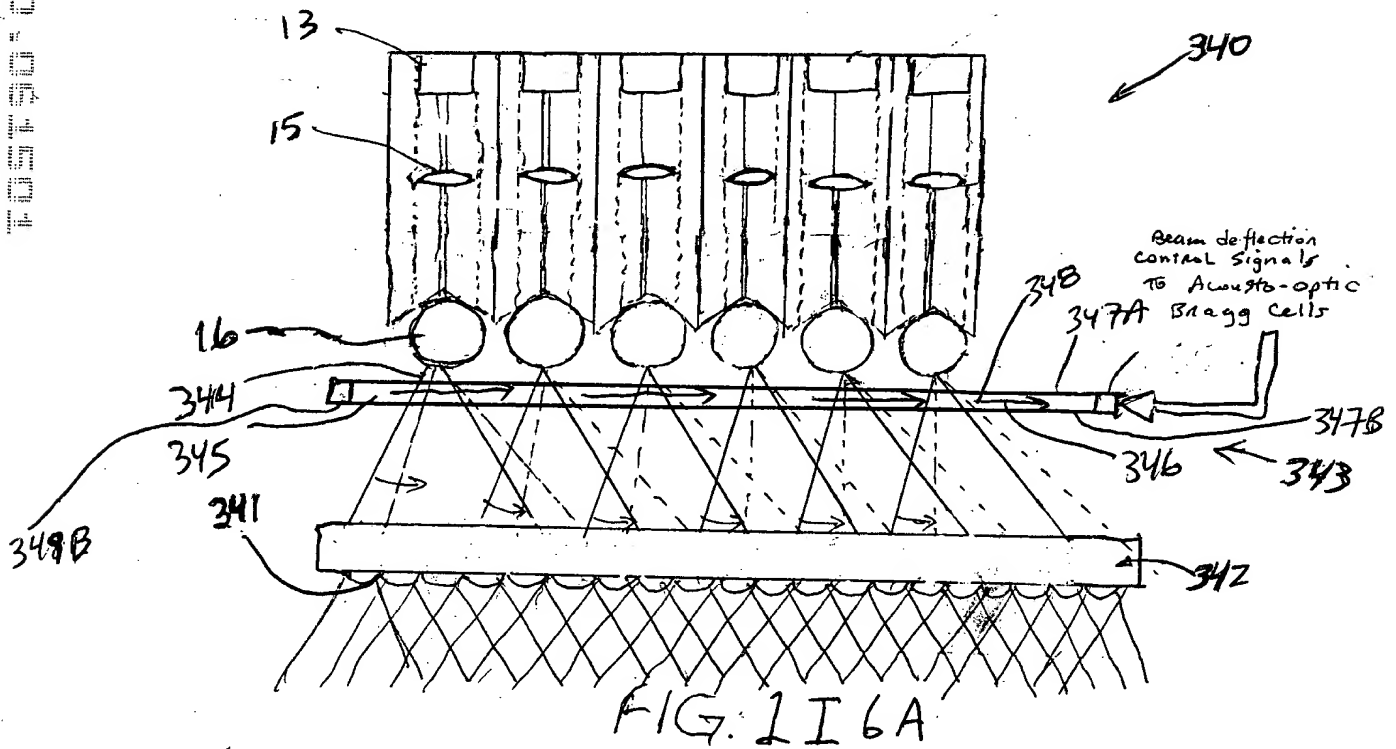
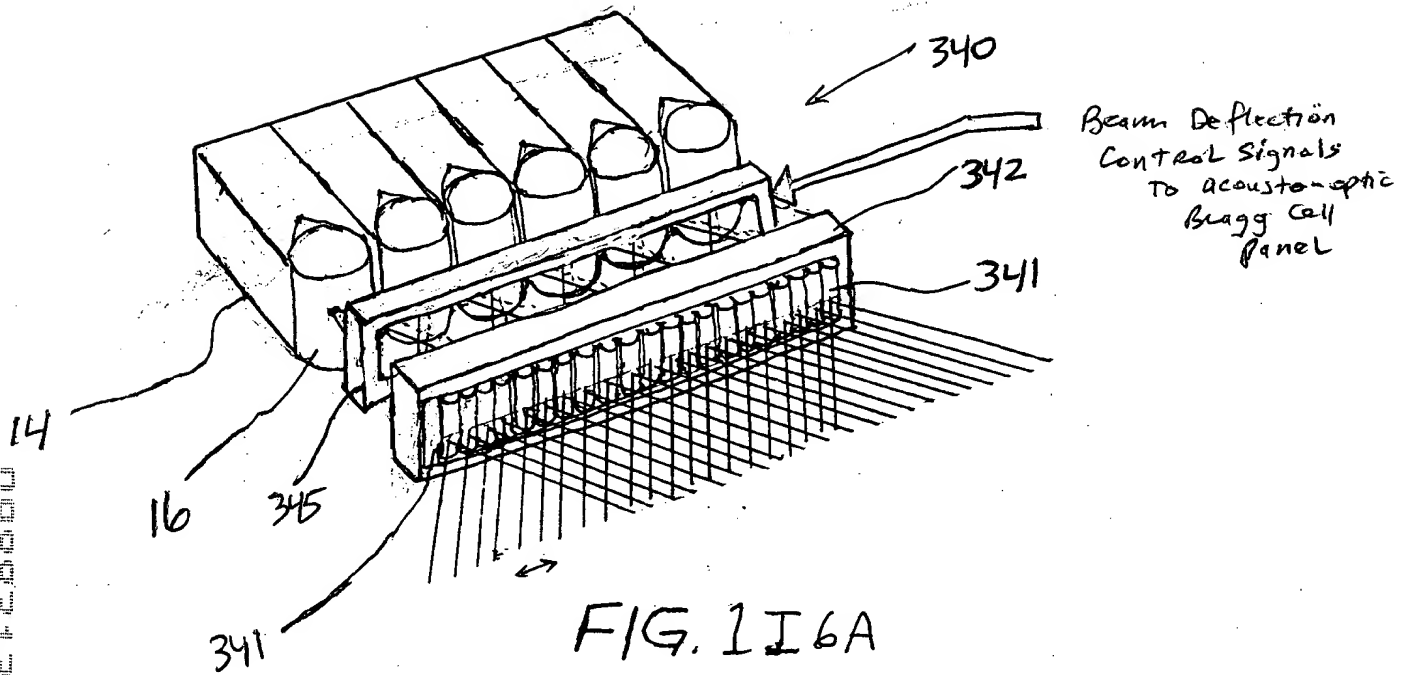


FIG. 1 I5B







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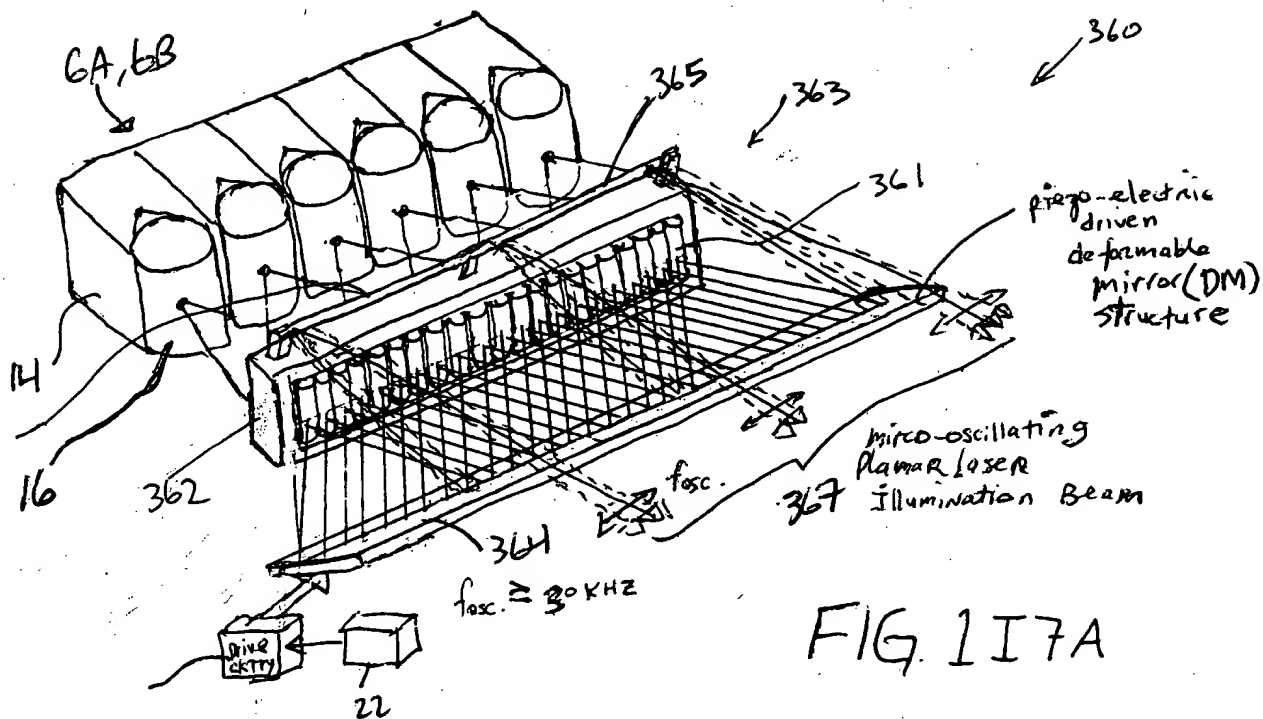


FIG 1I7A

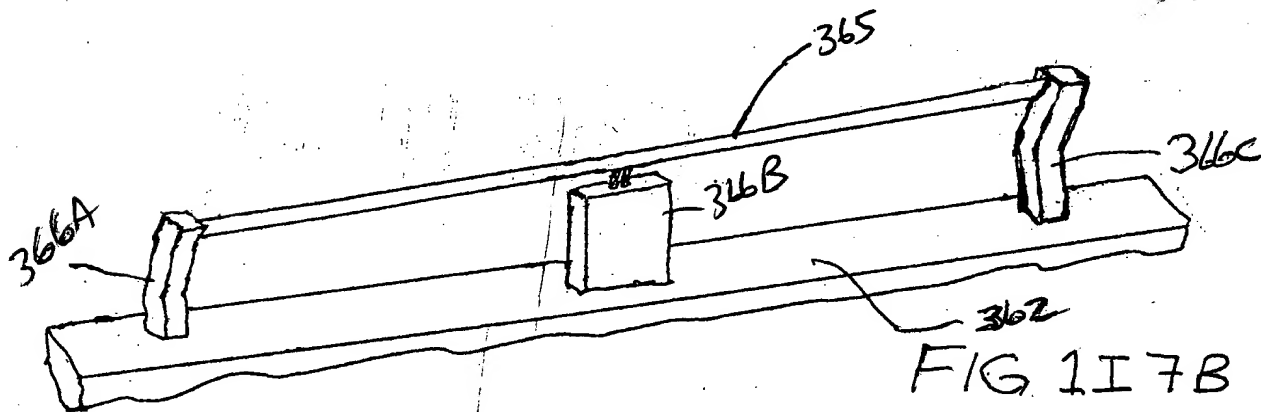


FIG 1I7B

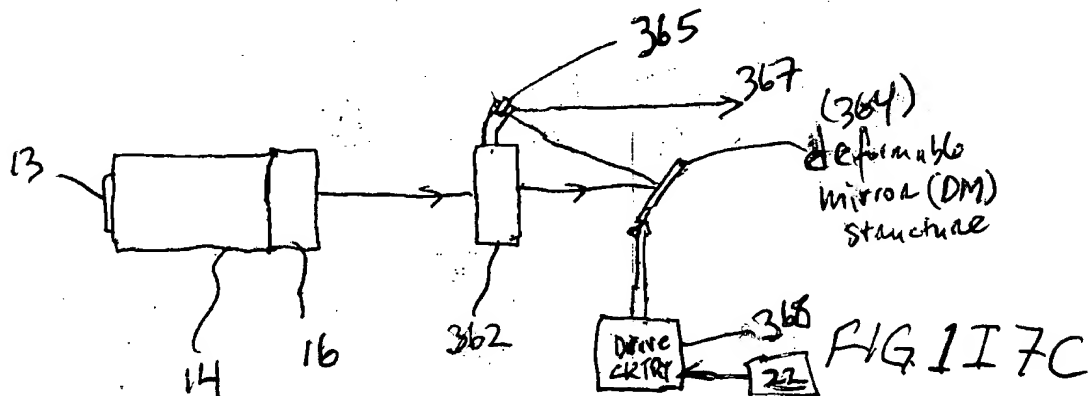


FIG 1I7C

FIG 1I7A

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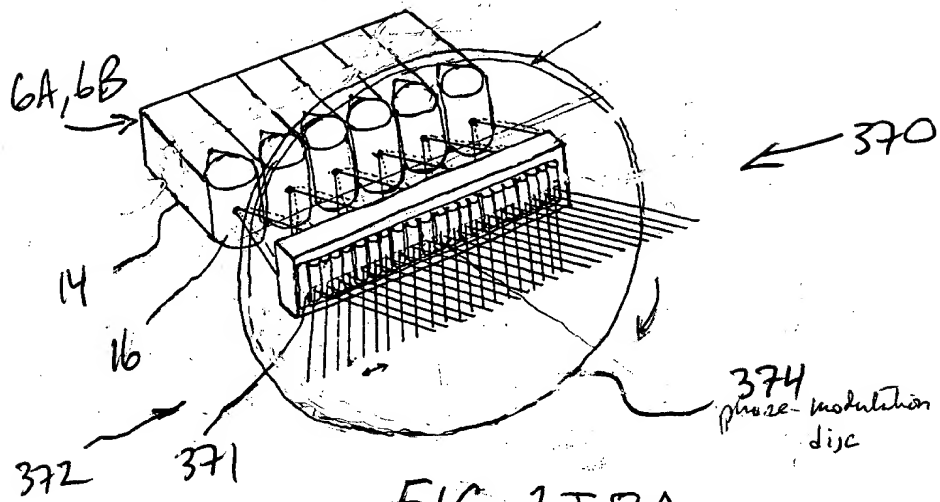


FIG. 1I8A

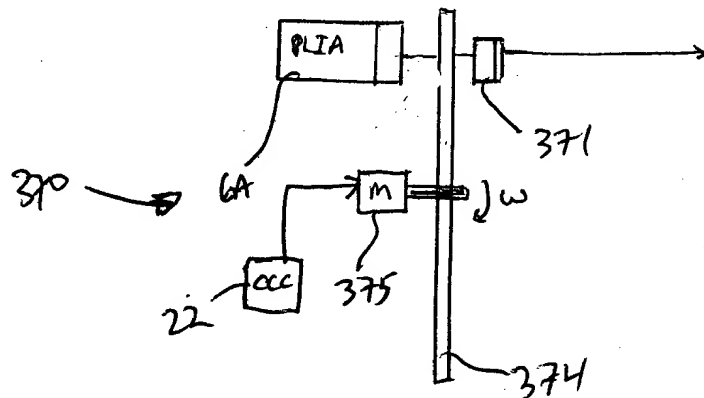


FIG. 1I8B

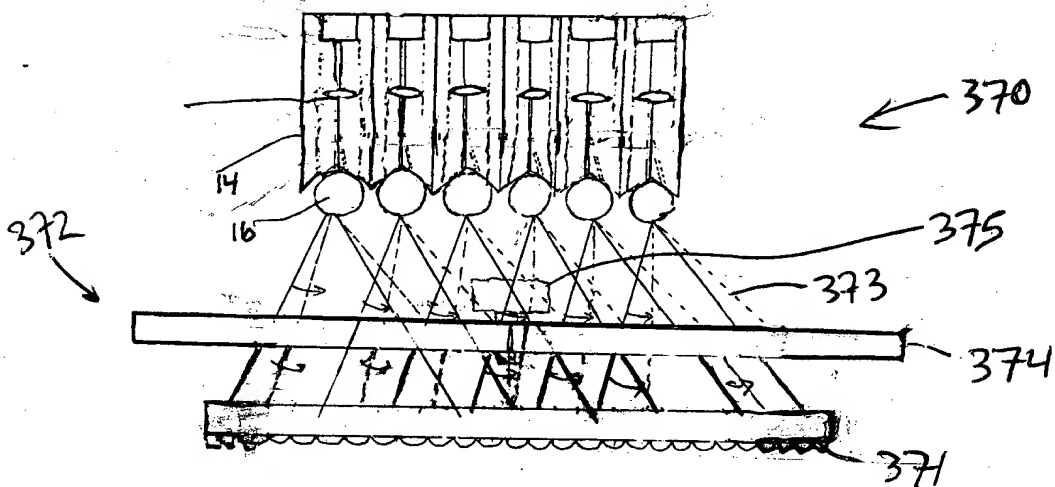


FIG. 1I8C

09003430-001501  
105150-0225560

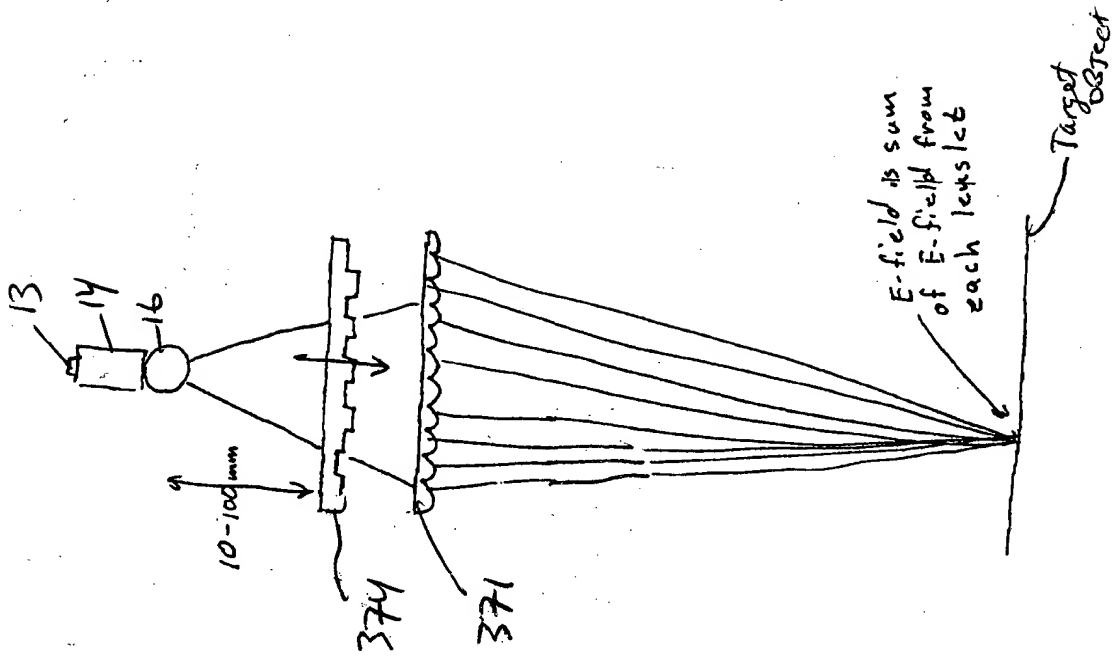


FIG 1I8E

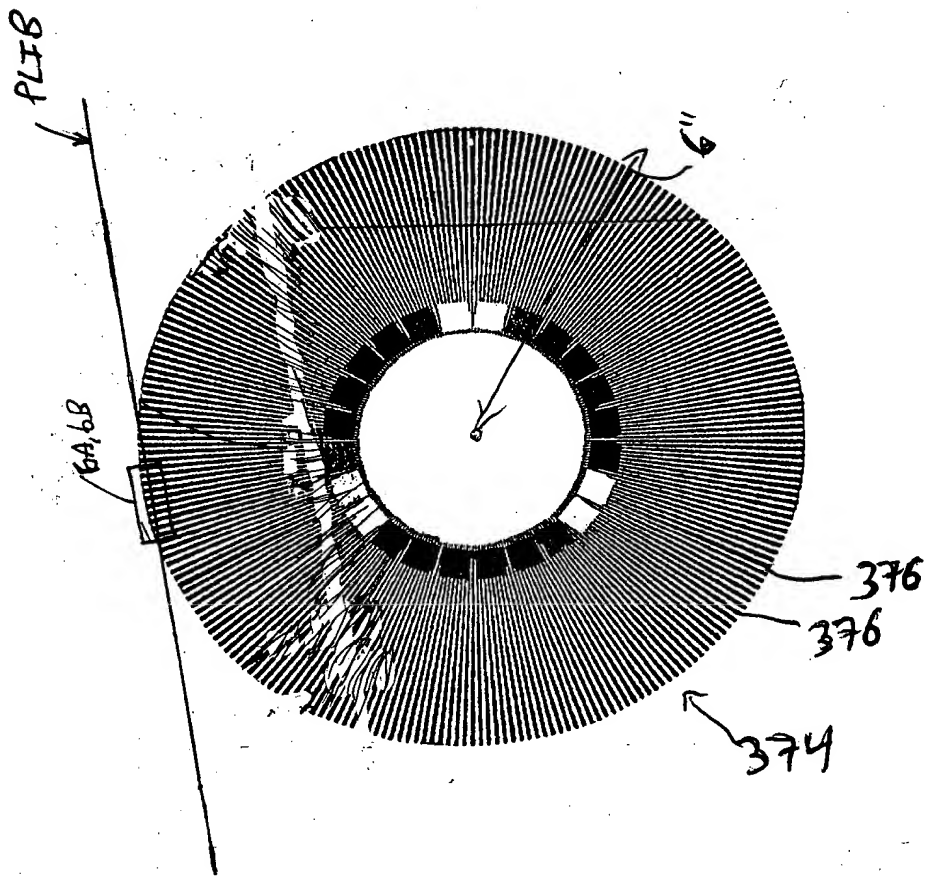


FIG 1I8D



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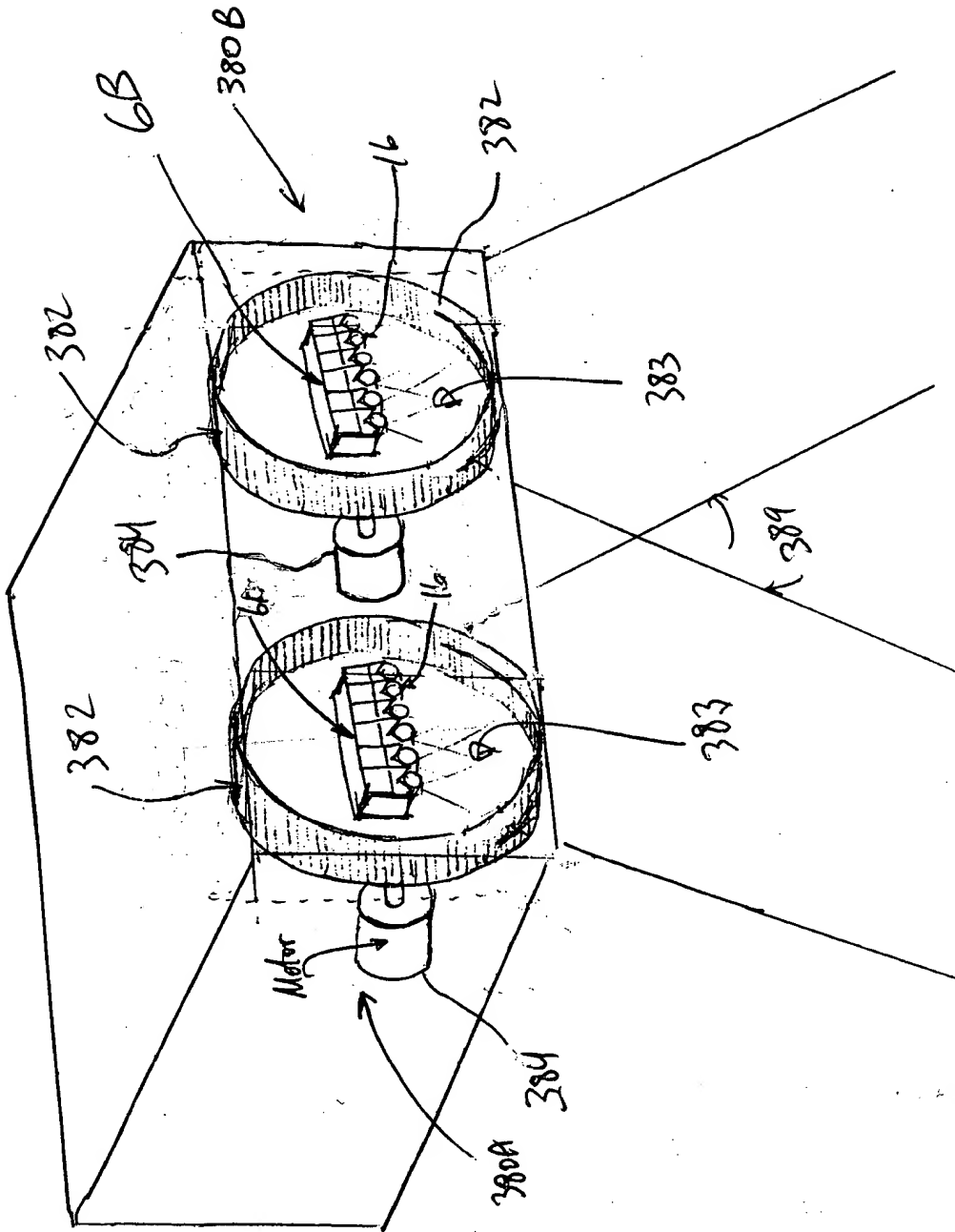
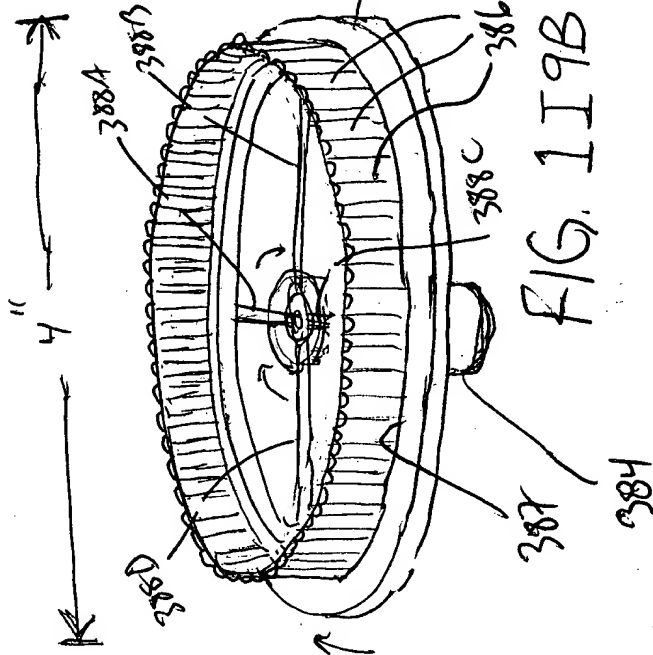


FIG. 119A

Optical specifications:

- 30 cylindrical lens (lens) per linear inch
- focal length: 2.0 millimeters
- diameter of lens carousel  $\approx 4$  inches
- acrylic material
- lens carousel elements on inside diameter



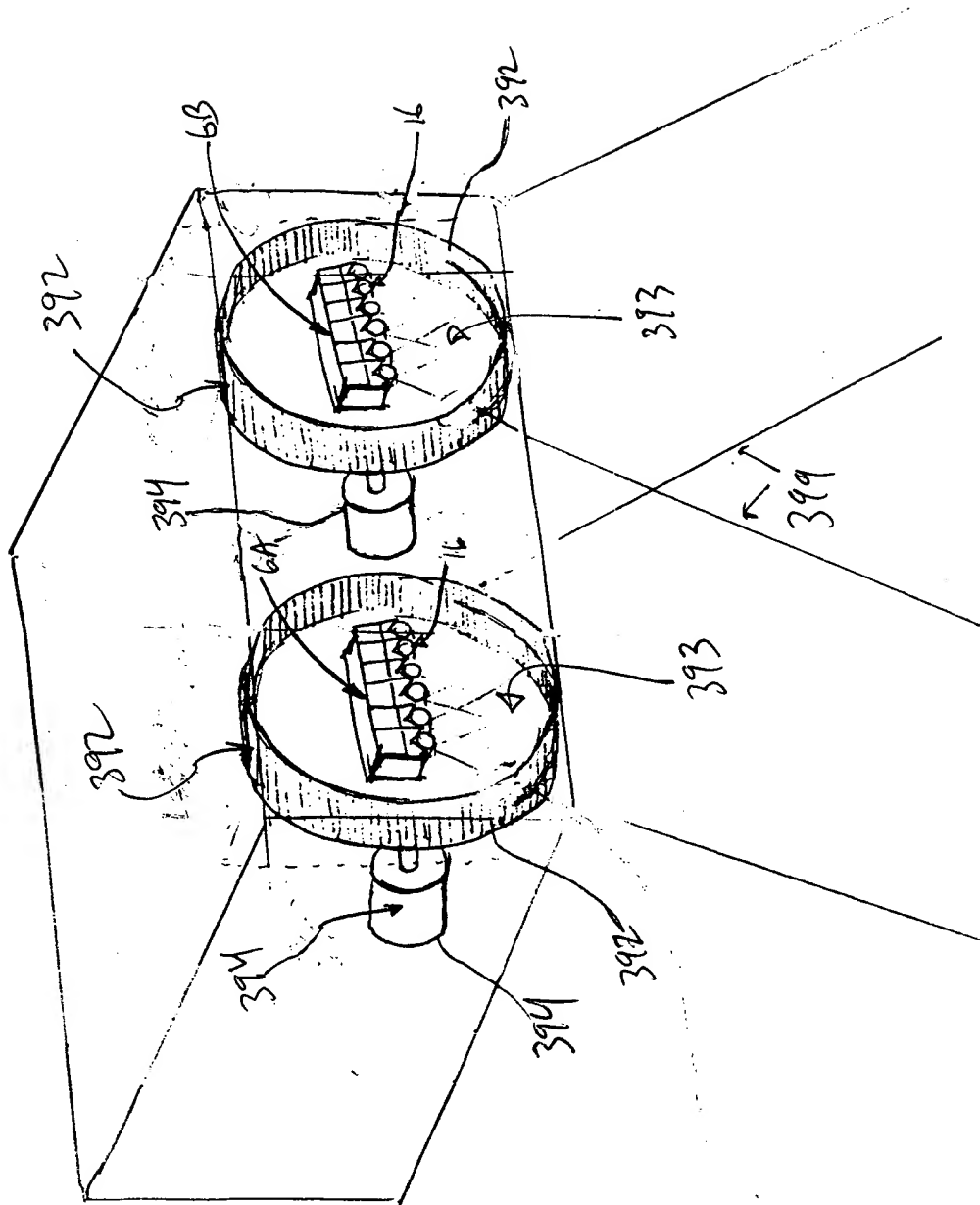


FIG. 1I10A

Optical Specifications:

4" →

- 388A 30 cylindrical lens (lens) per linear inch
- 388B focal length: 2.0 millimeters
- 388C diameter of cylindrical carousel ≈ 1/4 inches
- 388D acrylic material
- 388E cylindrical elements on inside diameter

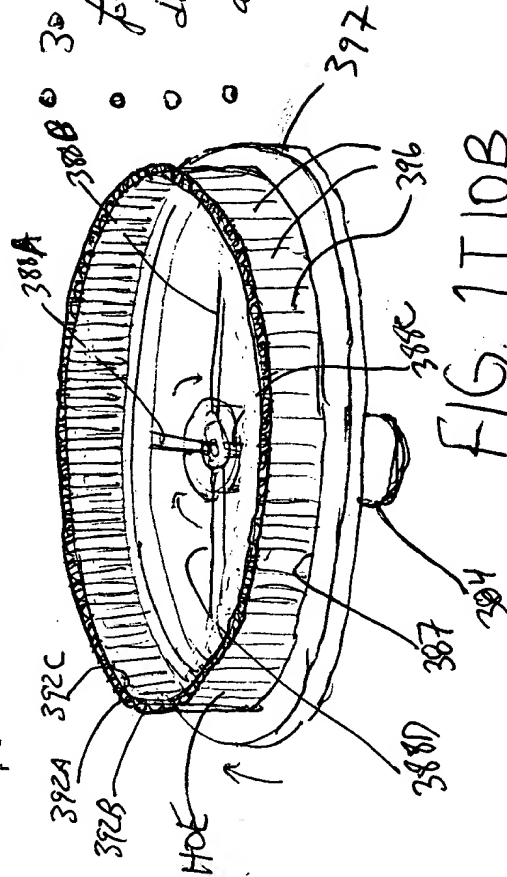


FIG. 1110B



FIG. 11A

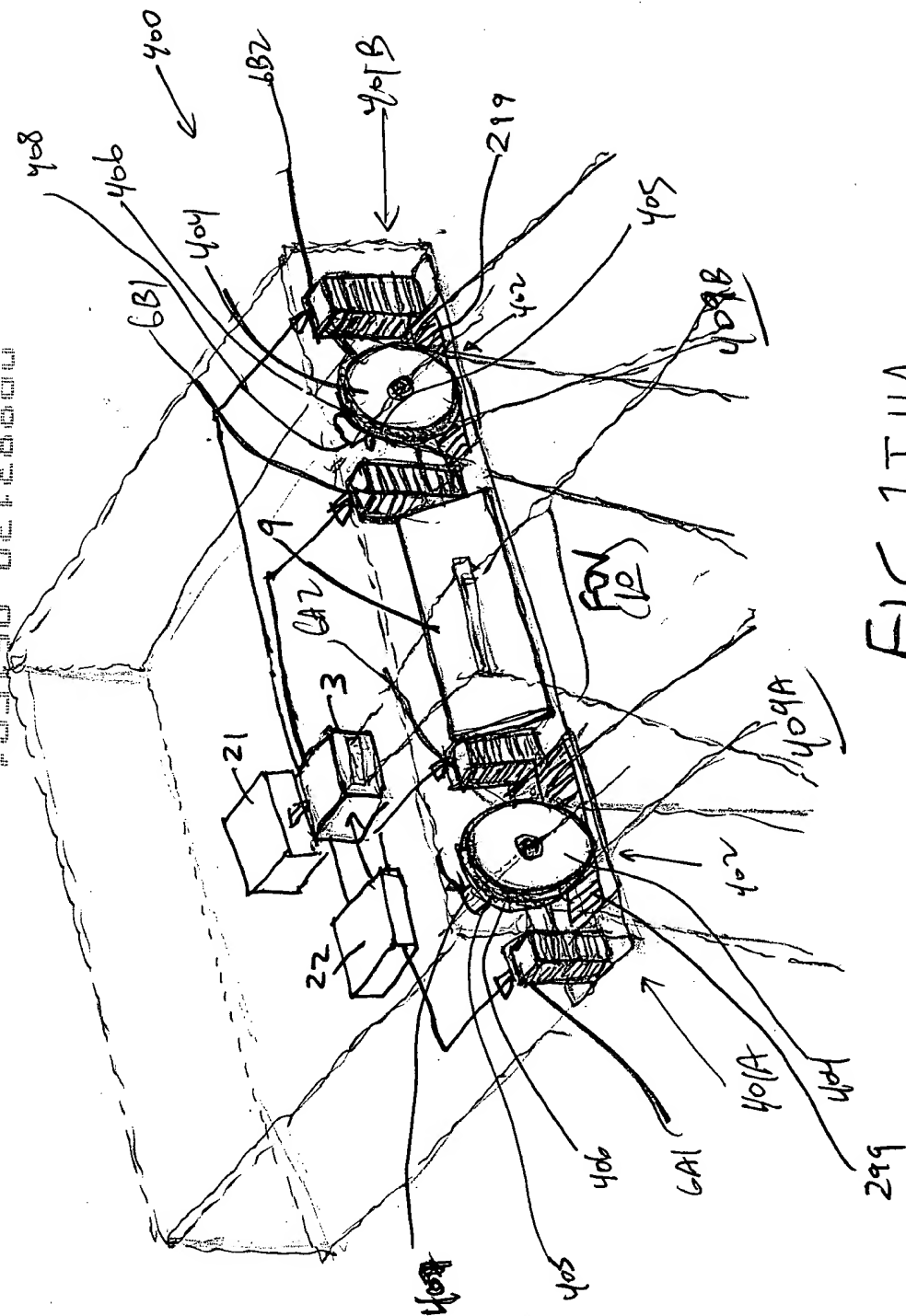


FIG. 11A

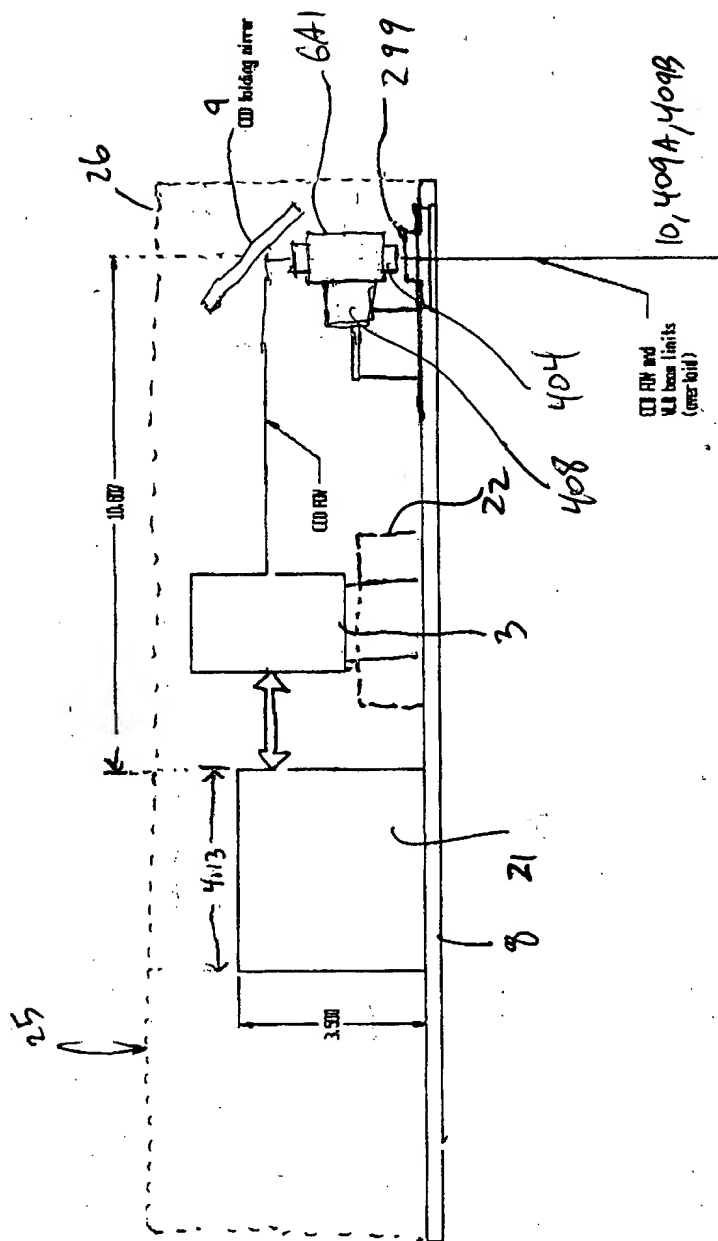


FIG 11/B

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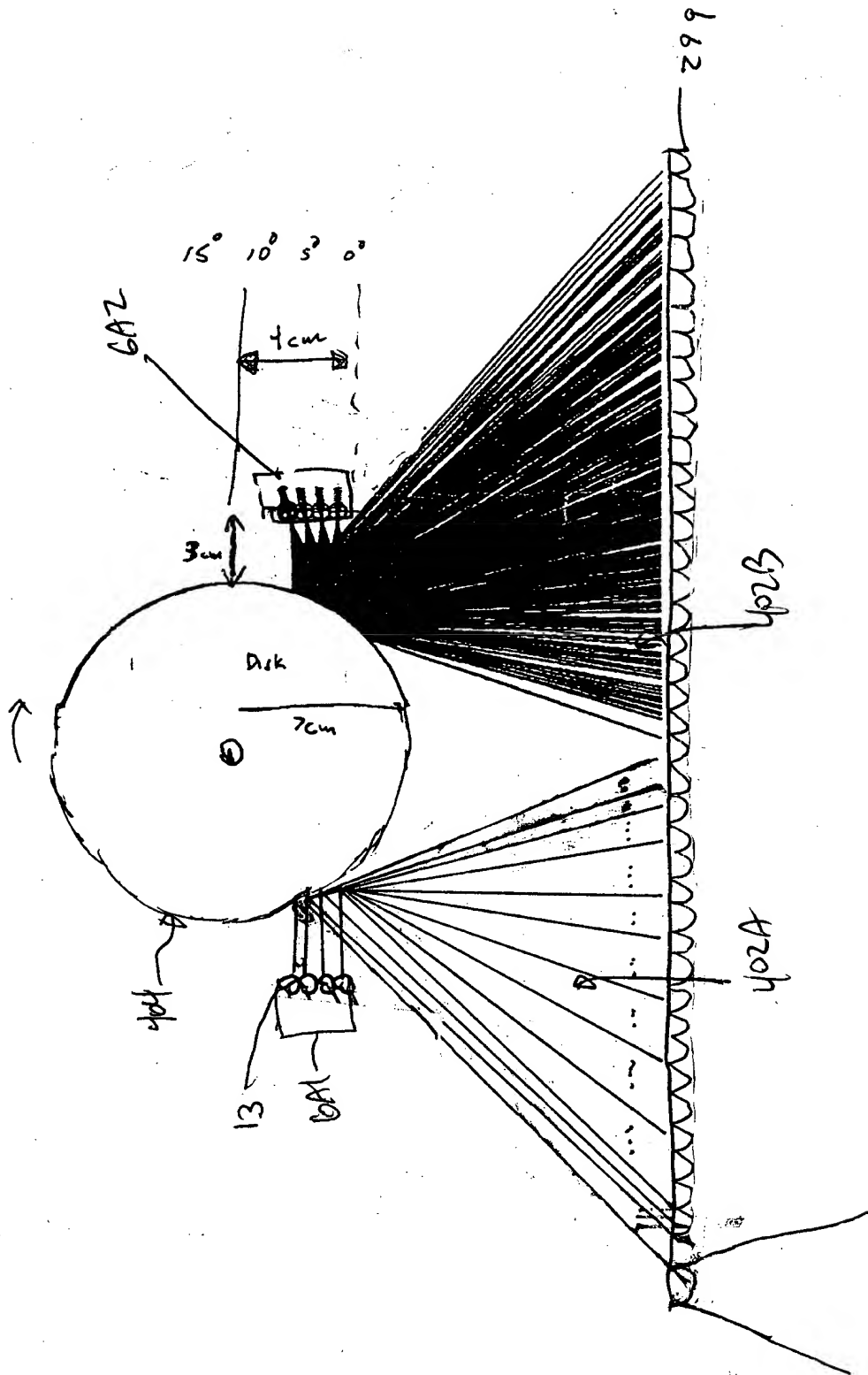


FIG. 111C

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Second Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of the FFD Subsystem (3)

(TIME)

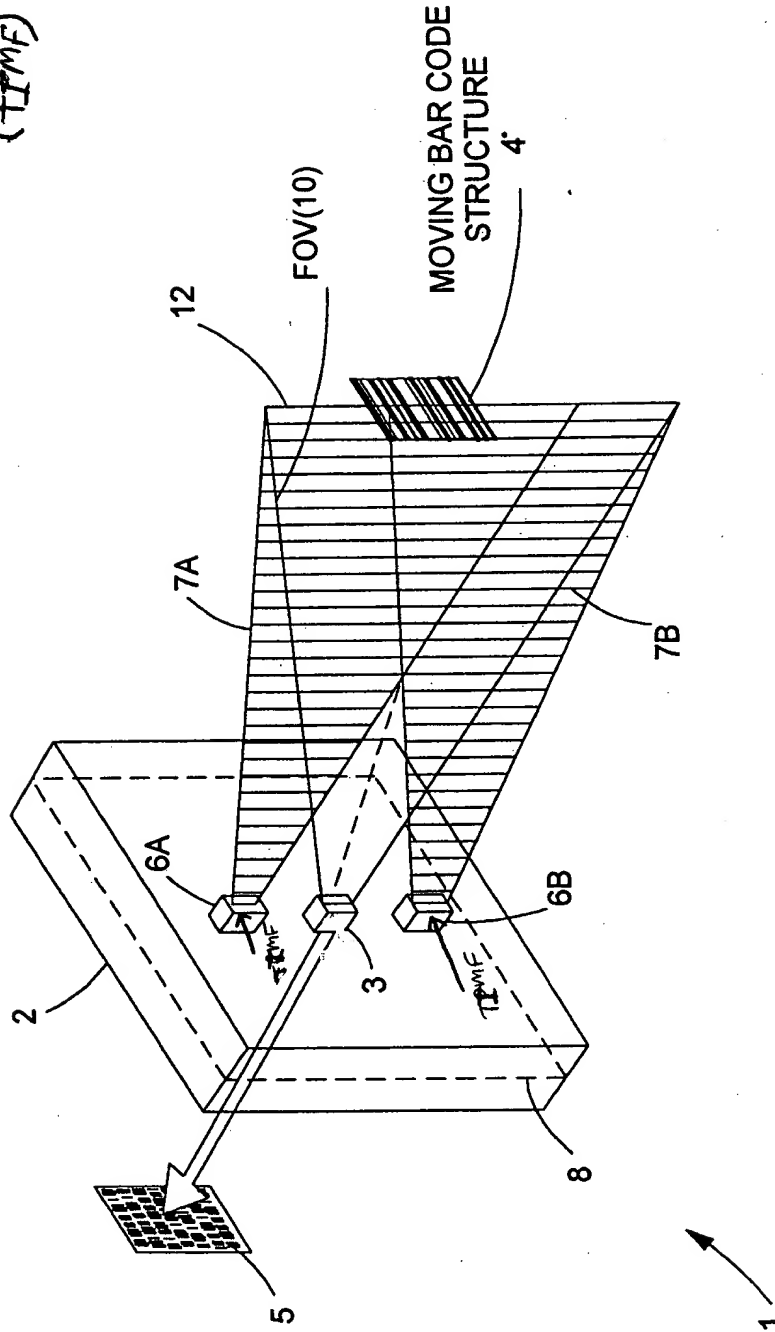
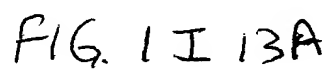


FIG. 1 I / 2

Case	Age	Sex	Site	Pathologic	Survival
1	65	M	Rectum	Adenocarcinoma	10 years
2	68	F	Rectum	Adenocarcinoma	12 years
3	72	M	Rectum	Adenocarcinoma	15 years
4	75	F	Rectum	Adenocarcinoma	18 years
5	78	M	Rectum	Adenocarcinoma	20 years
6	80	F	Rectum	Adenocarcinoma	22 years
7	82	M	Rectum	Adenocarcinoma	25 years
8	85	F	Rectum	Adenocarcinoma	28 years
9	88	M	Rectum	Adenocarcinoma	30 years
10	90	F	Rectum	Adenocarcinoma	32 years
11	92	M	Rectum	Adenocarcinoma	35 years
12	95	F	Rectum	Adenocarcinoma	38 years
13	98	M	Rectum	Adenocarcinoma	40 years
14	100	F	Rectum	Adenocarcinoma	42 years
15	102	M	Rectum	Adenocarcinoma	45 years
16	105	F	Rectum	Adenocarcinoma	48 years
17	108	M	Rectum	Adenocarcinoma	50 years
18	110	F	Rectum	Adenocarcinoma	52 years
19	112	M	Rectum	Adenocarcinoma	55 years
20	115	F	Rectum	Adenocarcinoma	58 years
21	118	M	Rectum	Adenocarcinoma	60 years
22	120	F	Rectum	Adenocarcinoma	62 years
23	122	M	Rectum	Adenocarcinoma	65 years
24	125	F	Rectum	Adenocarcinoma	68 years
25	128	M	Rectum	Adenocarcinoma	70 years
26	130	F	Rectum	Adenocarcinoma	72 years
27	132	M	Rectum	Adenocarcinoma	75 years
28	135	F	Rectum	Adenocarcinoma	78 years
29	138	M	Rectum	Adenocarcinoma	80 years
30	140	F	Rectum	Adenocarcinoma	82 years
31	142	M	Rectum	Adenocarcinoma	85 years
32	145	F	Rectum	Adenocarcinoma	88 years
33	148	M	Rectum	Adenocarcinoma	90 years
34	150	F	Rectum	Adenocarcinoma	92 years
35	152	M	Rectum	Adenocarcinoma	95 years
36	155	F	Rectum	Adenocarcinoma	98 years
37	158	M	Rectum	Adenocarcinoma	100 years
38	160	F	Rectum	Adenocarcinoma	102 years
39	162	M	Rectum	Adenocarcinoma	105 years
40	165	F	Rectum	Adenocarcinoma	108 years
41	168	M	Rectum	Adenocarcinoma	110 years
42	170	F	Rectum	Adenocarcinoma	112 years
43	172	M	Rectum	Adenocarcinoma	115 years
44	175	F	Rectum	Adenocarcinoma	118 years
45	178	M	Rectum	Adenocarcinoma	120 years
46	180	F	Rectum	Adenocarcinoma	122 years
47	182	M	Rectum	Adenocarcinoma	125 years
48	185	F	Rectum	Adenocarcinoma	128 years
49	188	M	Rectum	Adenocarcinoma	130 years
50	190	F	Rectum	Adenocarcinoma	132 years
51	192	M	Rectum	Adenocarcinoma	135 years
52	195	F	Rectum	Adenocarcinoma	138 years
53	198	M	Rectum	Adenocarcinoma	140 years
54	200	F	Rectum	Adenocarcinoma	142 years
55	202	M	Rectum	Adenocarcinoma	145 years
56	205	F	Rectum	Adenocarcinoma	148 years
57	208	M	Rectum	Adenocarcinoma	150 years
58	210	F	Rectum	Adenocarcinoma	152 years
59	212	M	Rectum	Adenocarcinoma	155 years
60	215	F	Rectum	Adenocarcinoma	158 years
61	218	M	Rectum	Adenocarcinoma	160 years
62	220	F	Rectum	Adenocarcinoma	162 years
63	222	M	Rectum	Adenocarcinoma	165 years
64	225	F	Rectum	Adenocarcinoma	168 years
65	228	M	Rectum	Adenocarcinoma	170 years
66	230	F	Rectum	Adenocarcinoma	172 years
67	232	M	Rectum	Adenocarcinoma	175 years
68	235	F	Rectum	Adenocarcinoma	178 years
69					



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**The Second Generalized Speckle-Noise Pattern Reduction Method**  
**Of The Present Invention**

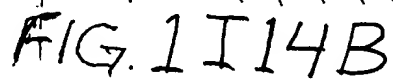
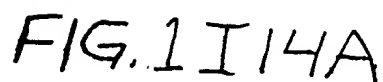
Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal intensity of the transmitted PLIB along the planar extent thereof according to a temporal intensity modulation function (TIMF) so as to modulate the phase along the wavefront of the transmitted PLIB and produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

A

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

B

FIG. 1I/3B



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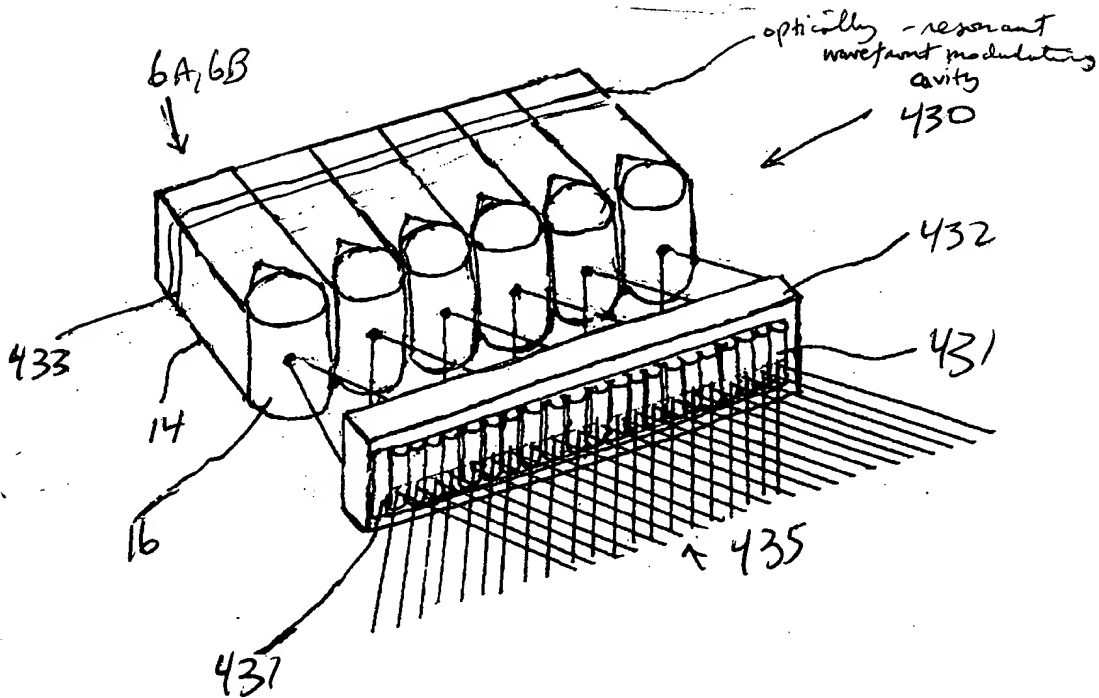


FIG. 1I15A

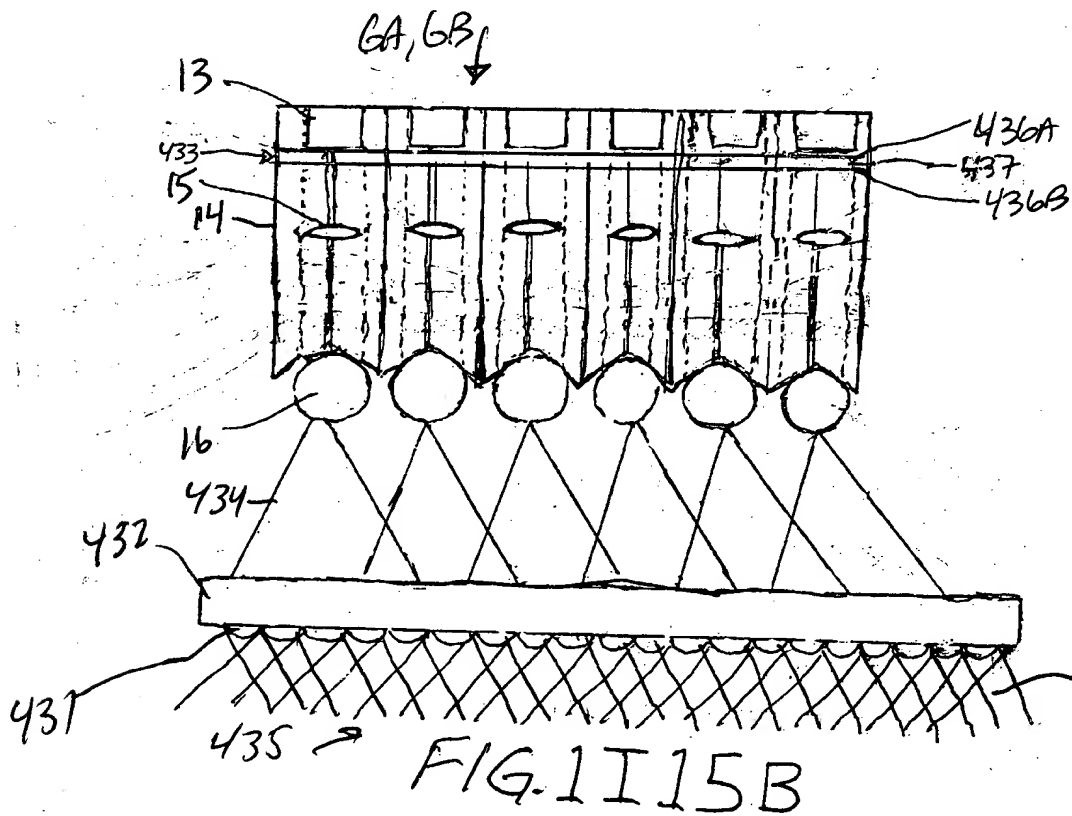


FIG. 1I15B



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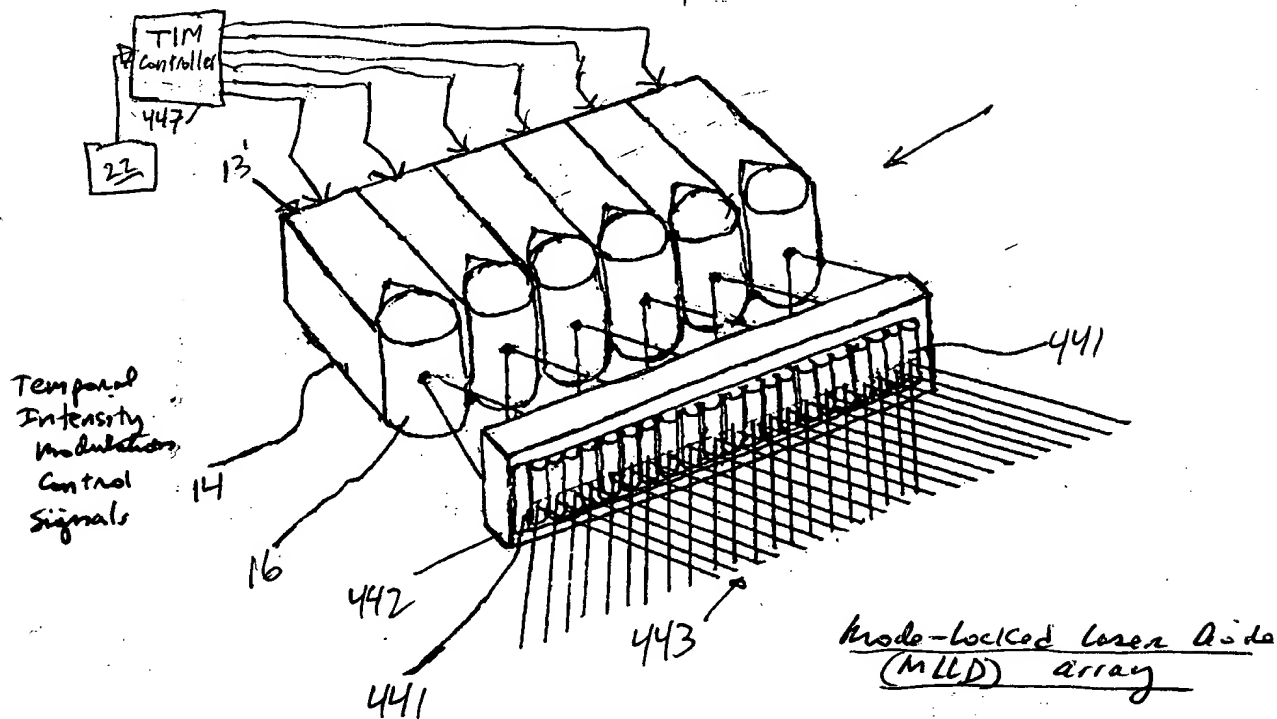


FIG. 1I15C

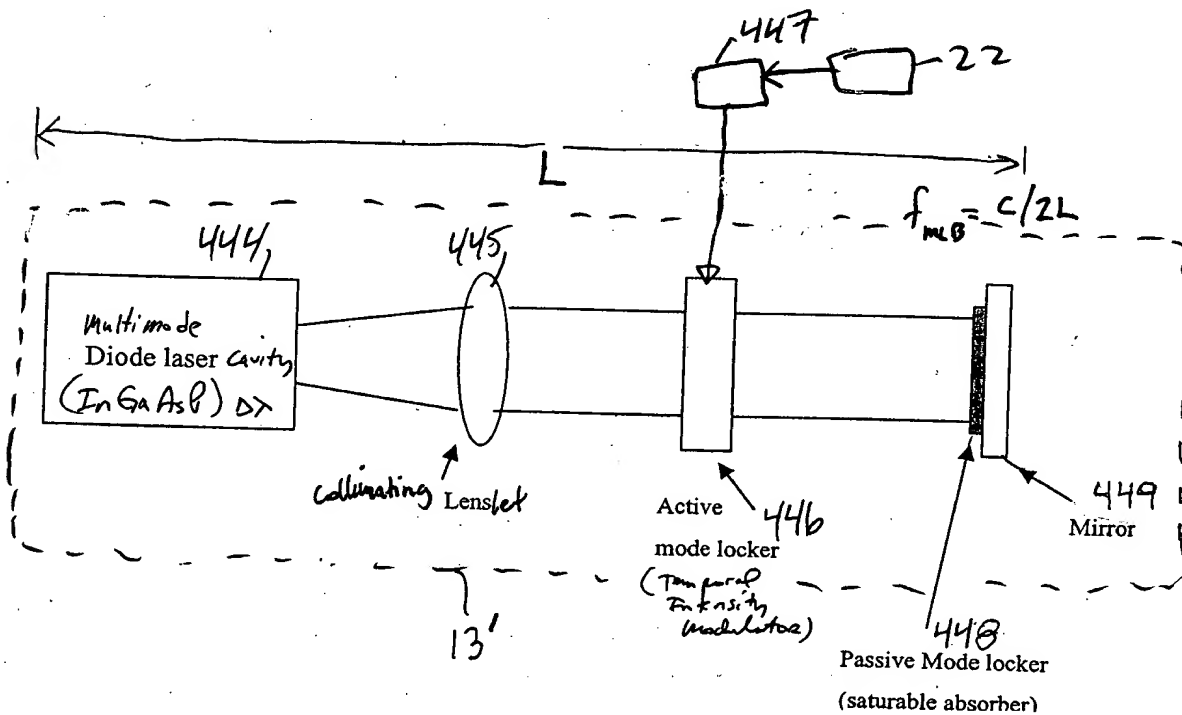


FIG. 1I15D

FOOTNOTES: 00000130-061501

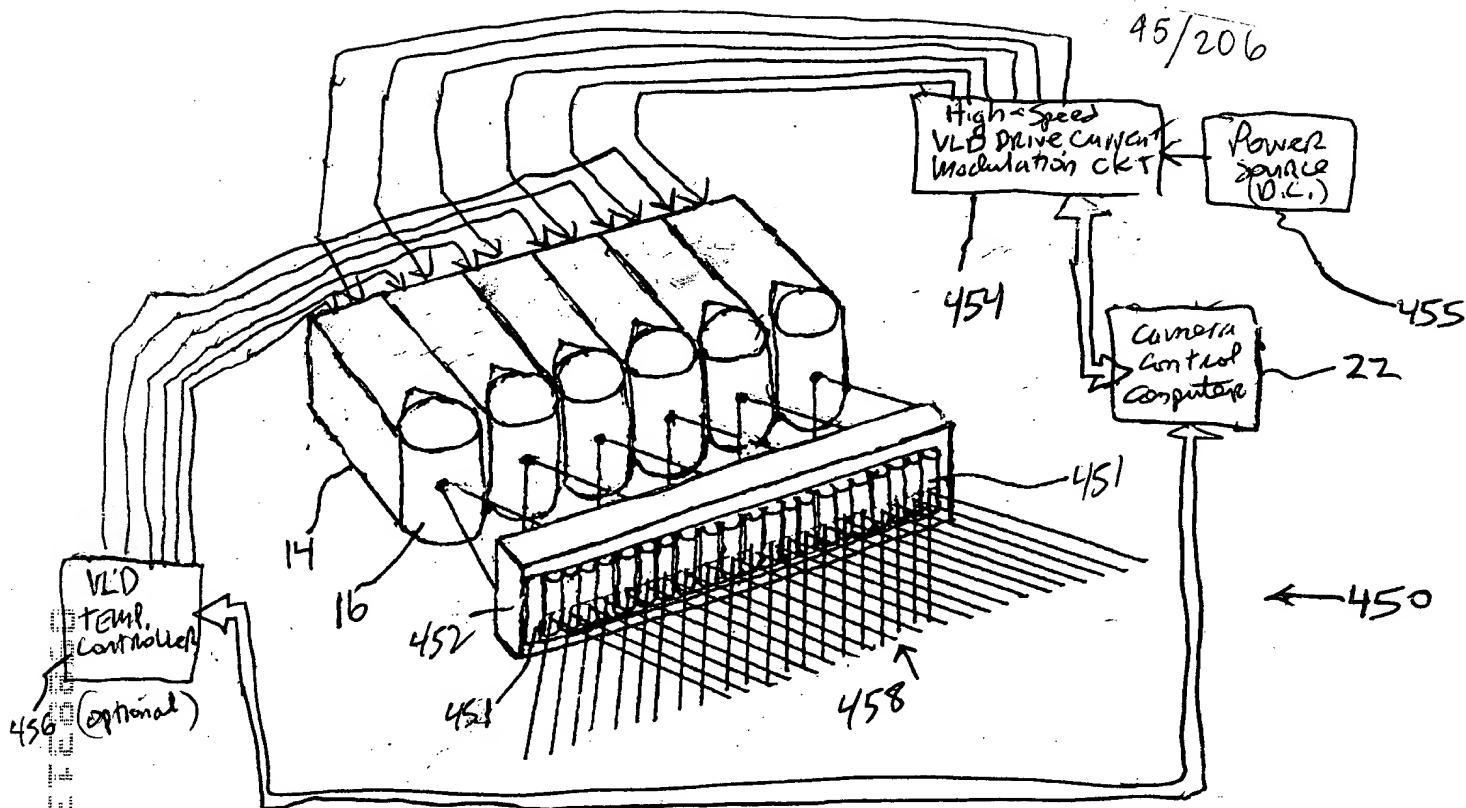
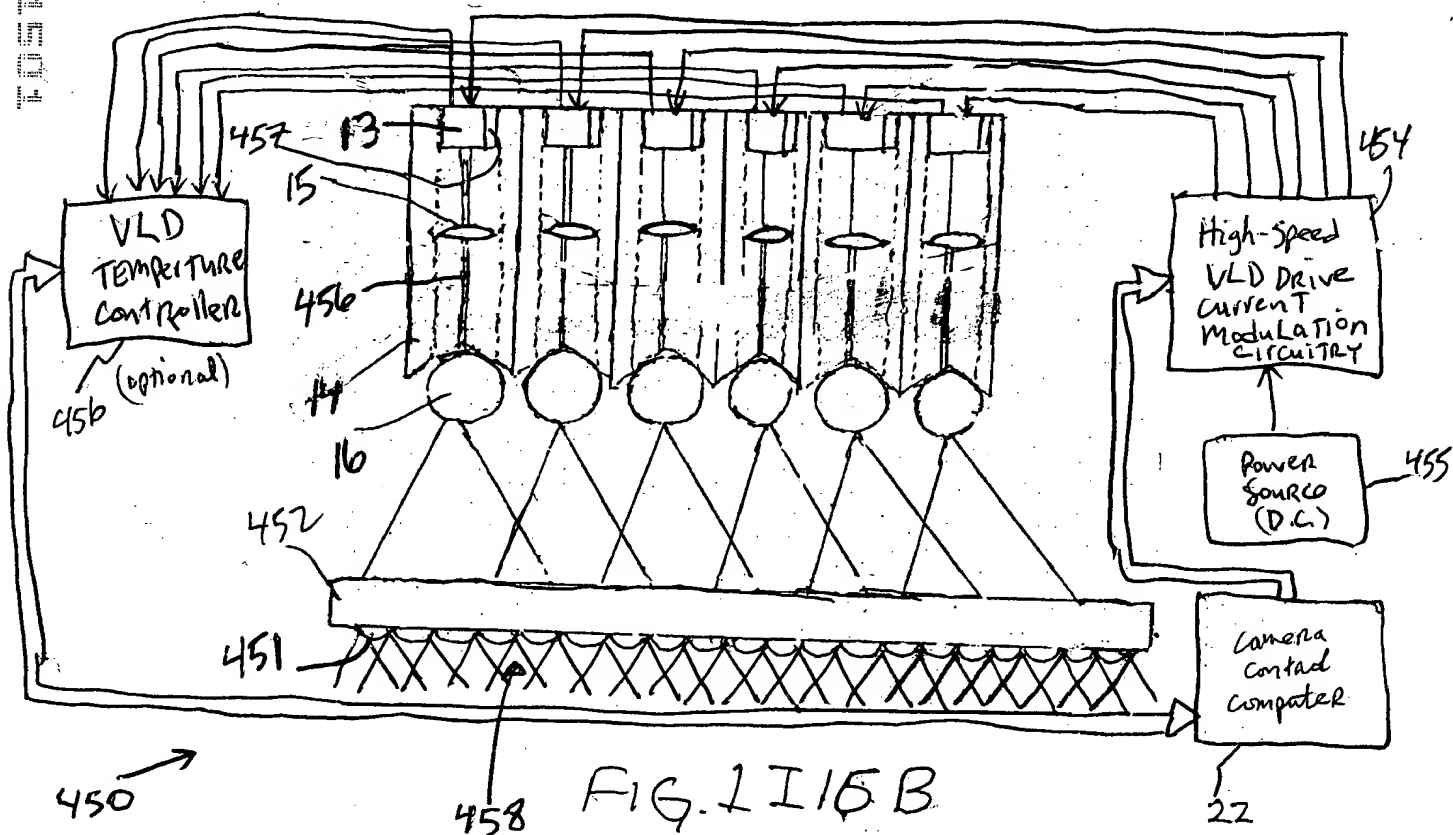


FIG. 1I16A



Third GENERALIZED METHOD  
of Reducing Speckle-Noise  
PATTERNS AT IMAGE  
Detection array OF THE  
FFD subsystem (3)

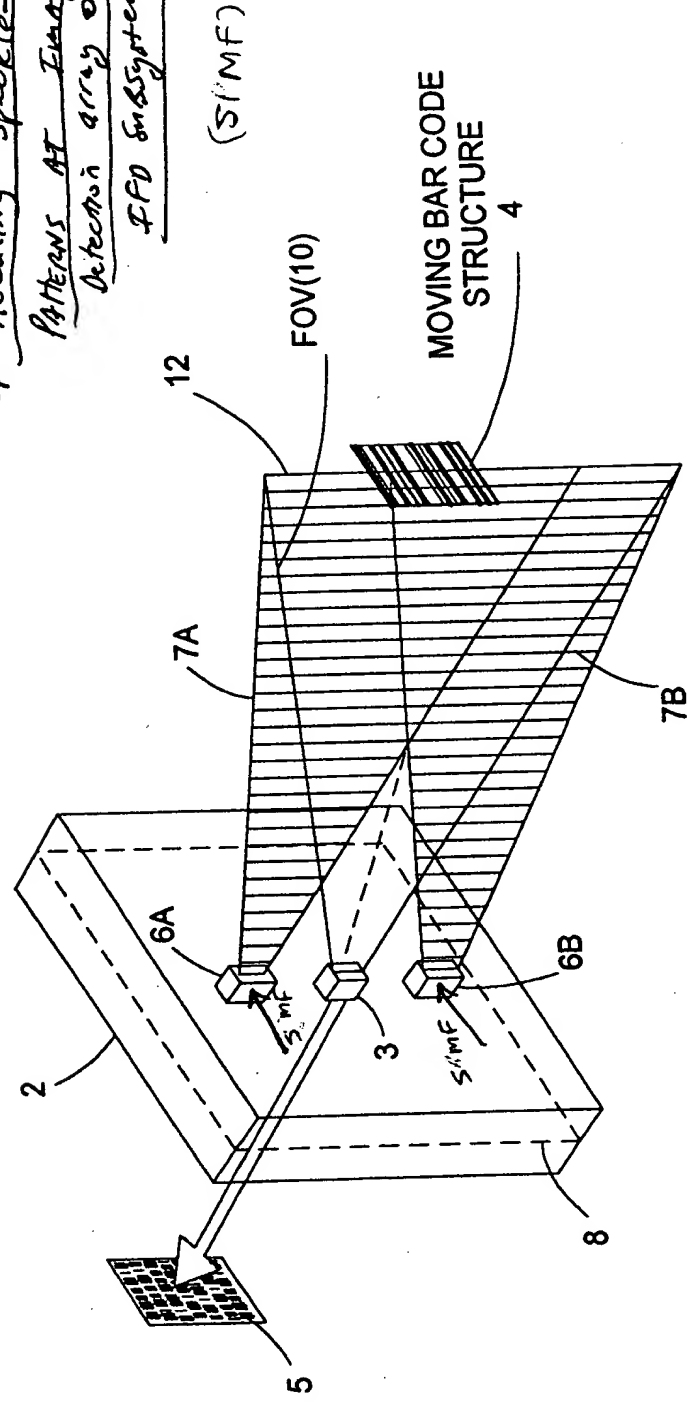


FIG 17

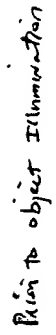


FIG 1 IBA

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial intensity of the transmitted PLIB along the planar extent thereof according to a spatial intensity modulation function (SIMF) so as to modulate the phase along the wavefront of the transmitted PLIB and produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

**Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.**

FIG. 1I18B

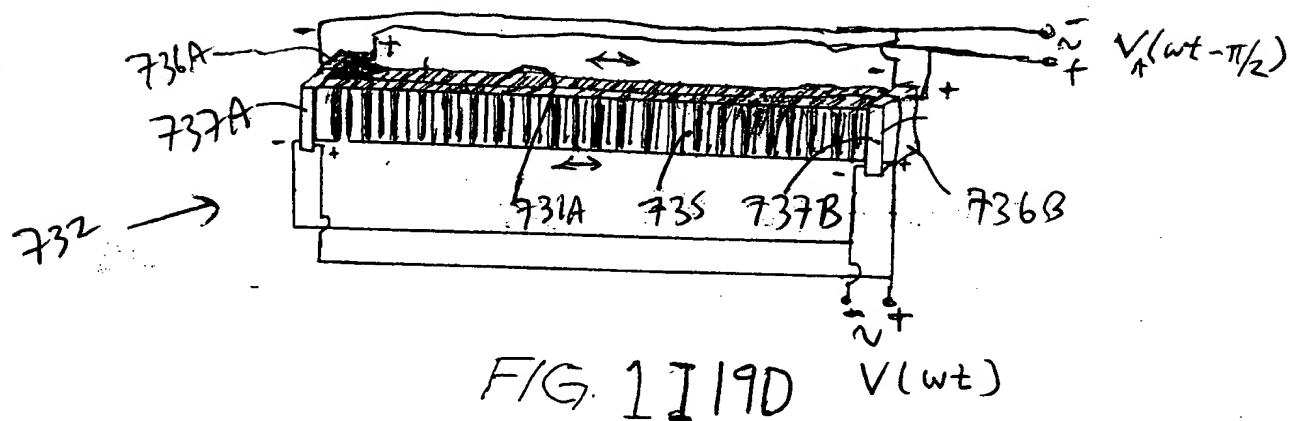
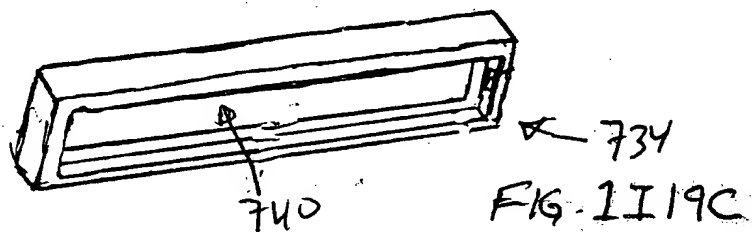
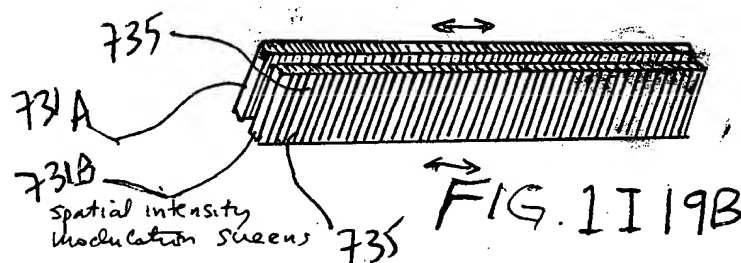
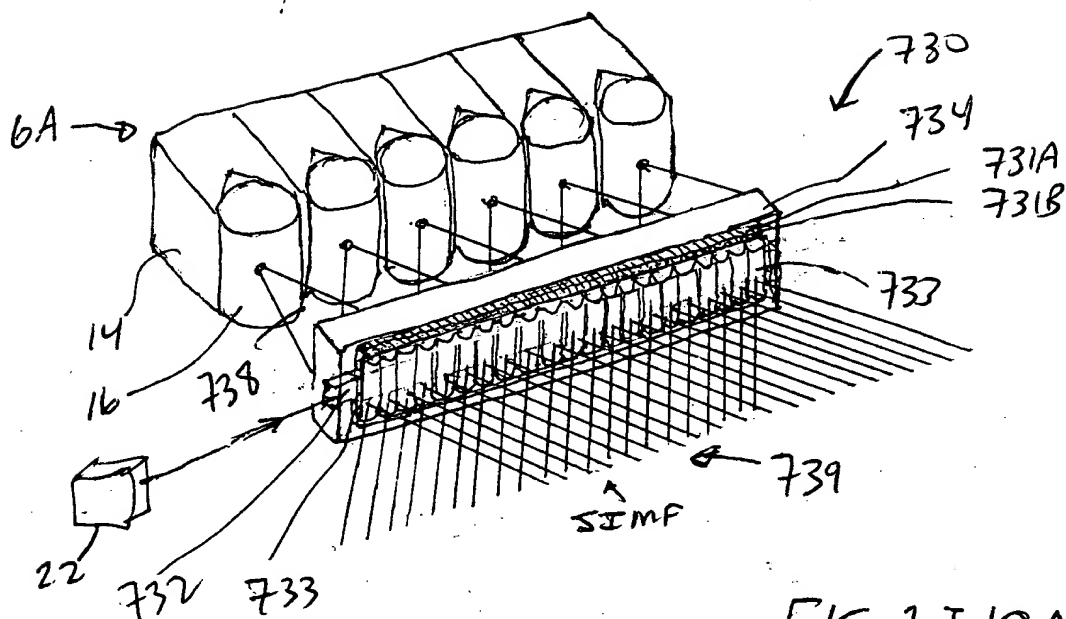


FIG. 1120

Fourth Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of the IFD Subsystem

(SIMF)

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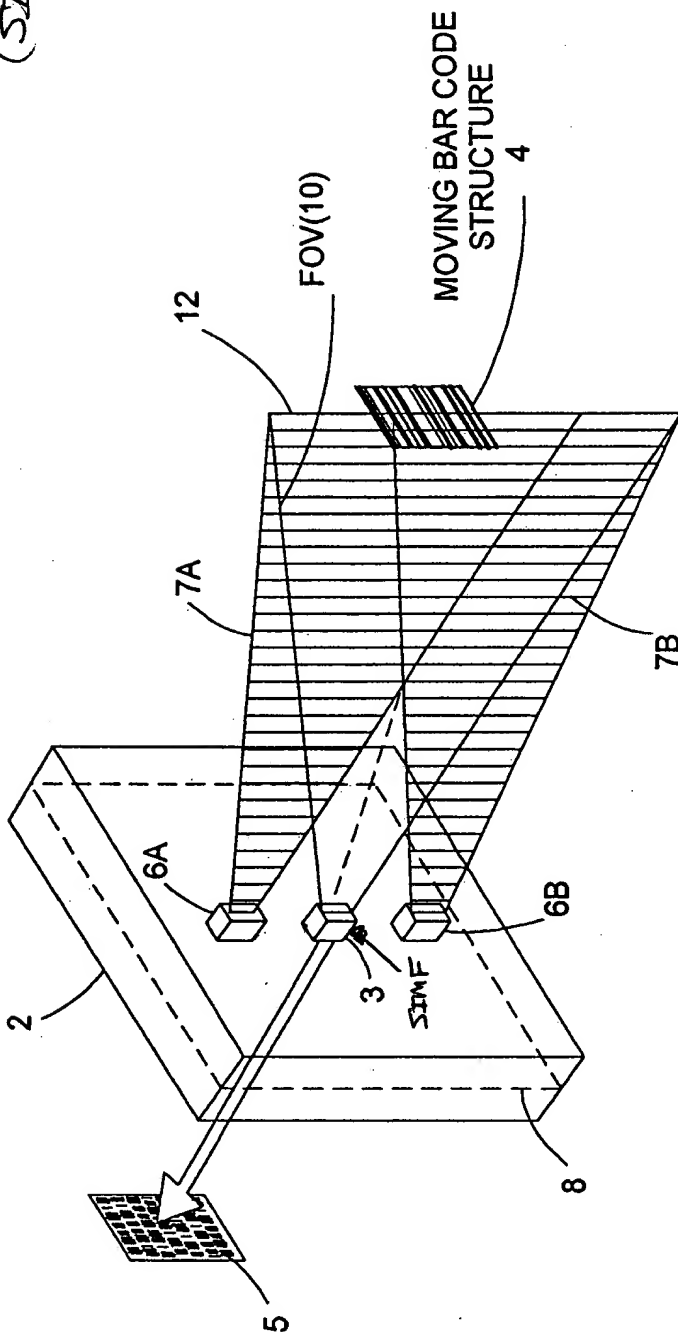


FIG. 1120

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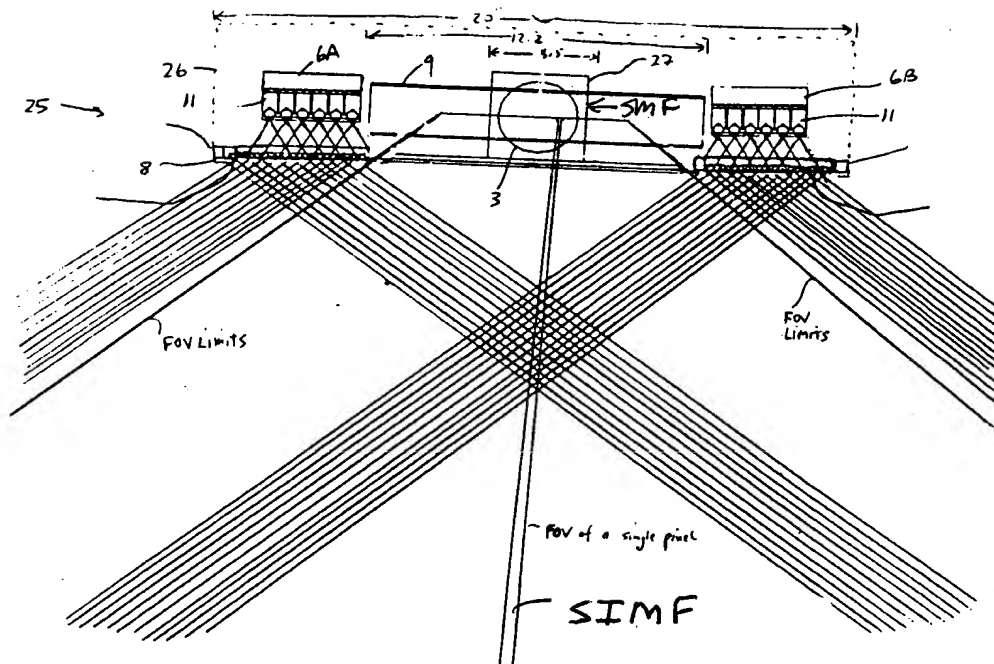


FIG. II 21A

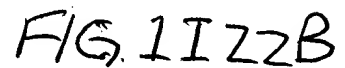
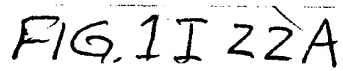


The ~~Fourth~~ Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

After illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial intensity of the reflected/scattered (i.e. received) PLIB along the planar extent thereof according to a spatial intensity modulation function (SIMF) so as to modulate the phase along the wavefront of the received PLIB and produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof. A

Temporally average the many substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the speckle-noise pattern observed at the image detection array. B

FIG. 1I21B



Fourth Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of IR IFD Subsystem

(TIME)

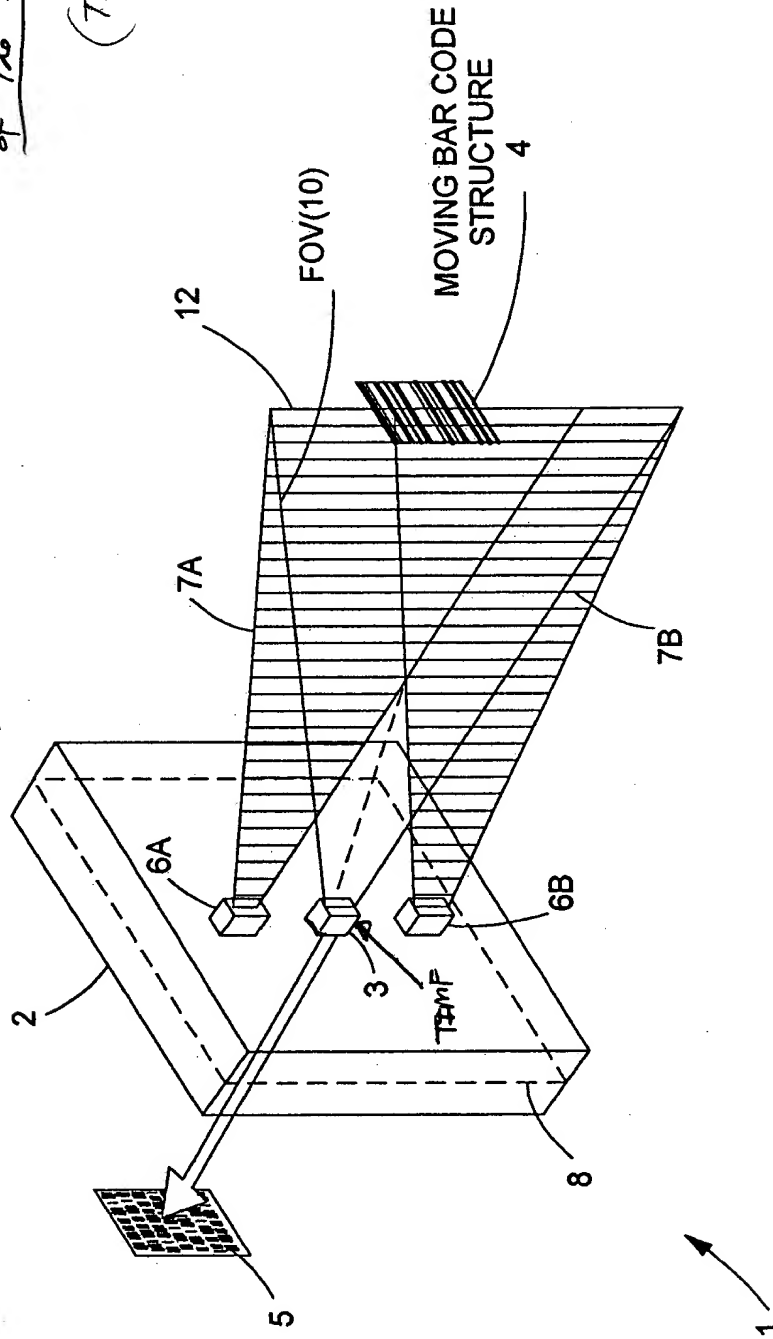


FIG. 1123

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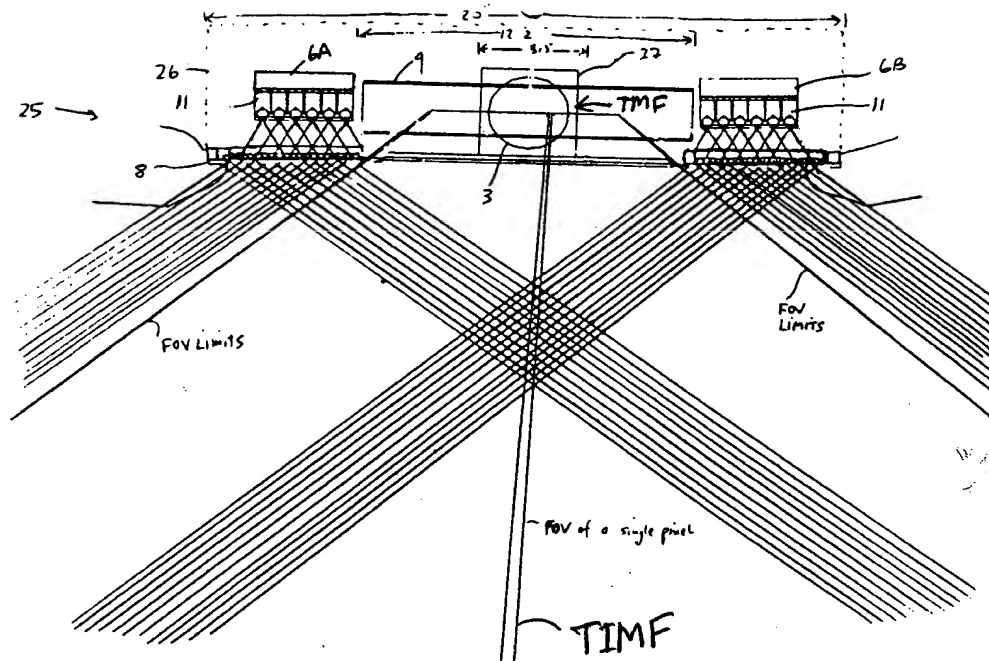


FIG. 1I24A

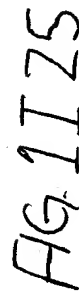
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The Fifth Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

After illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal intensity of the reflected/scattered (i.e. received) PLIB along the planar extent thereof according to a temporal intensity modulation function (TIME) so as to modulate the phase along the wavefront of the received PLIB and produce many substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the many substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the speckle-noise pattern observed at the image detection array.

FIG. 1I 24B



AG 1125

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Fixed focal length lens  
cases

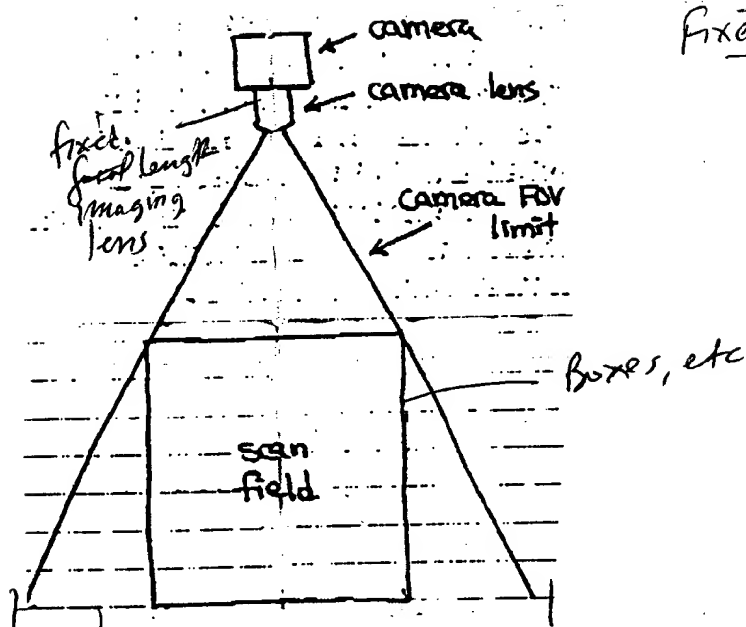
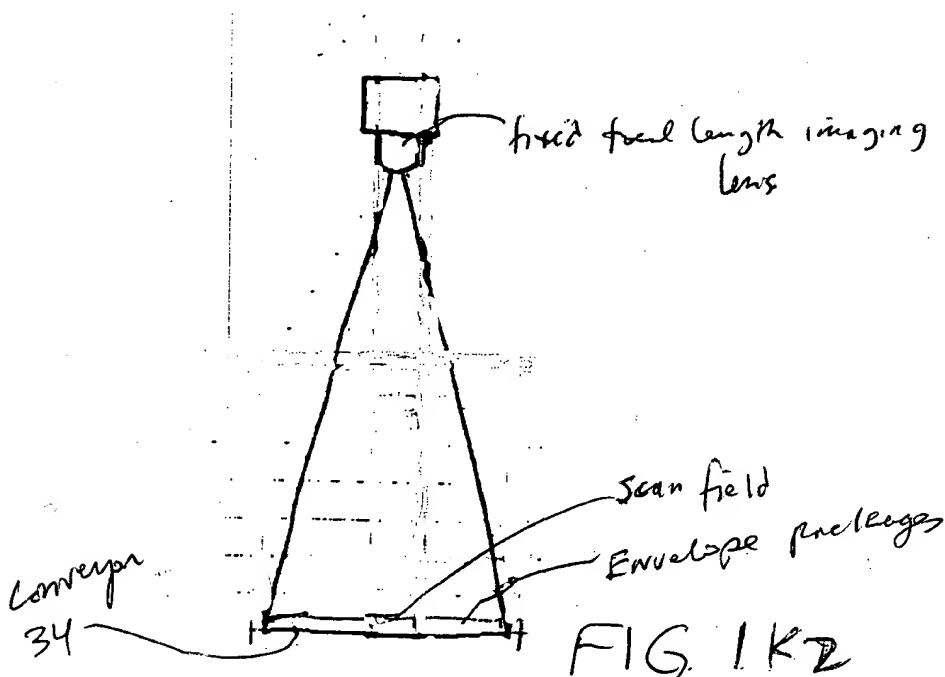


FIG. 1K1  
conveyer 34



conveyer  
34

FIG. 1K2

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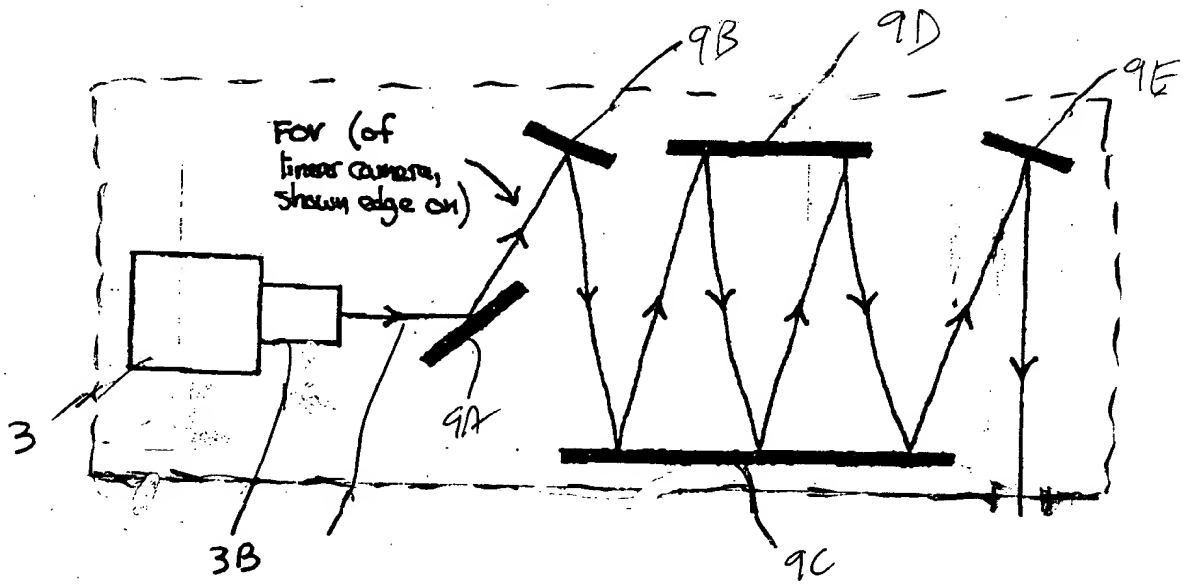


FIG. 1L1

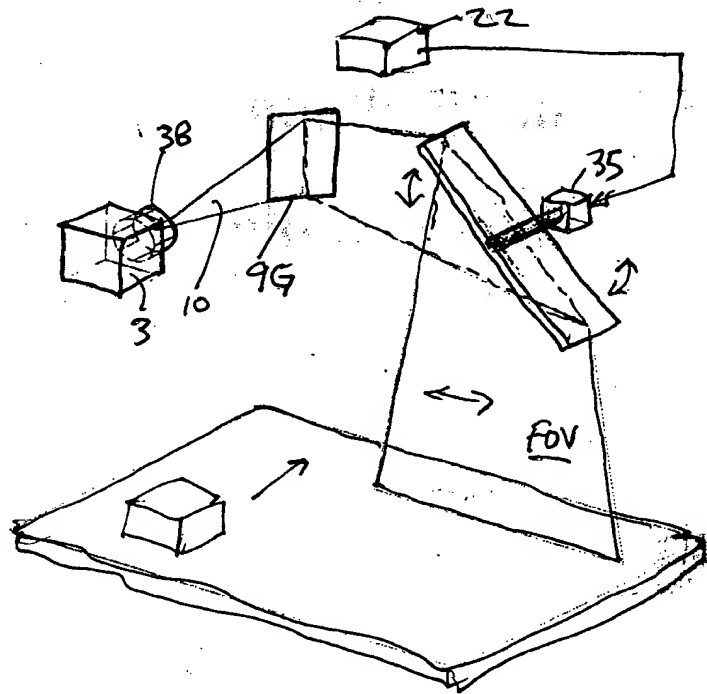


FIG. 1L2



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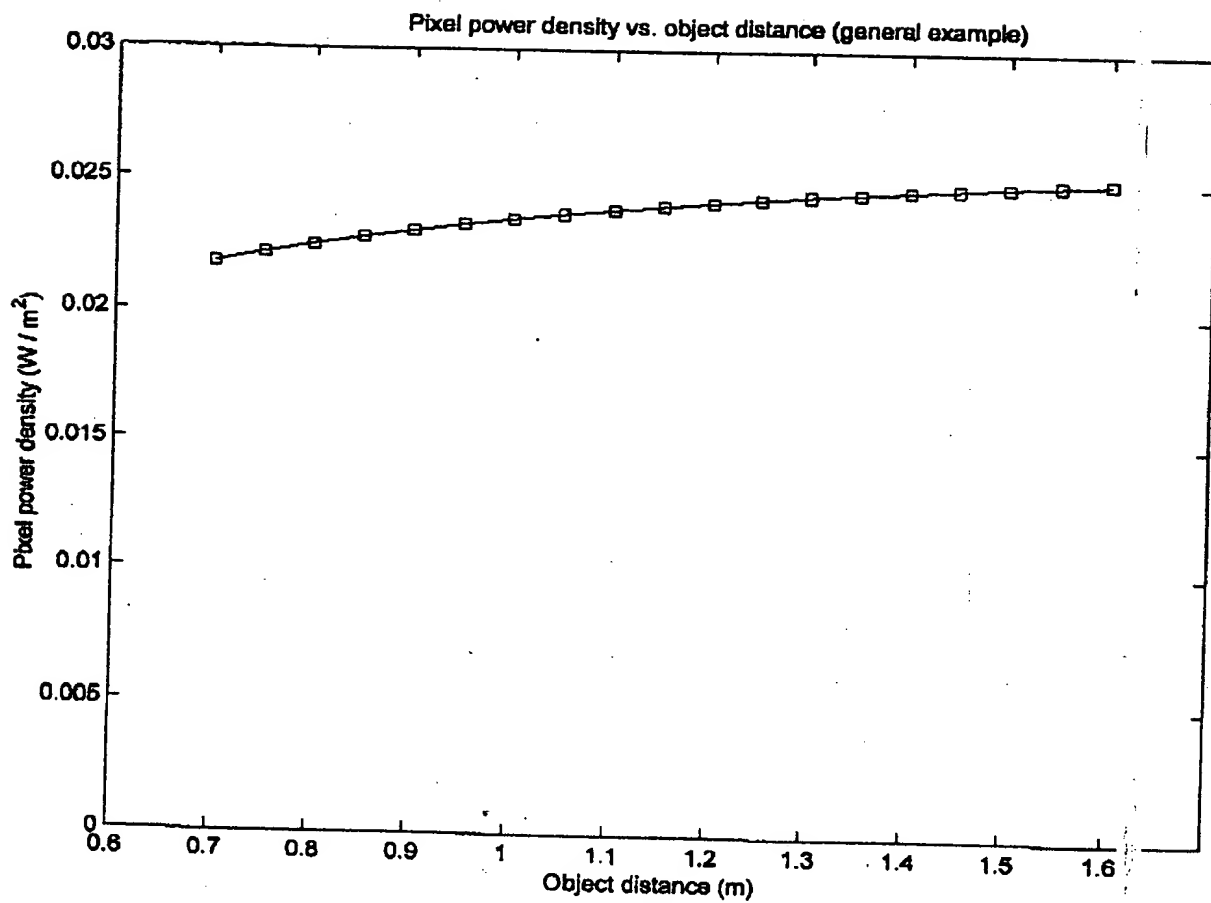


FIG-1M1

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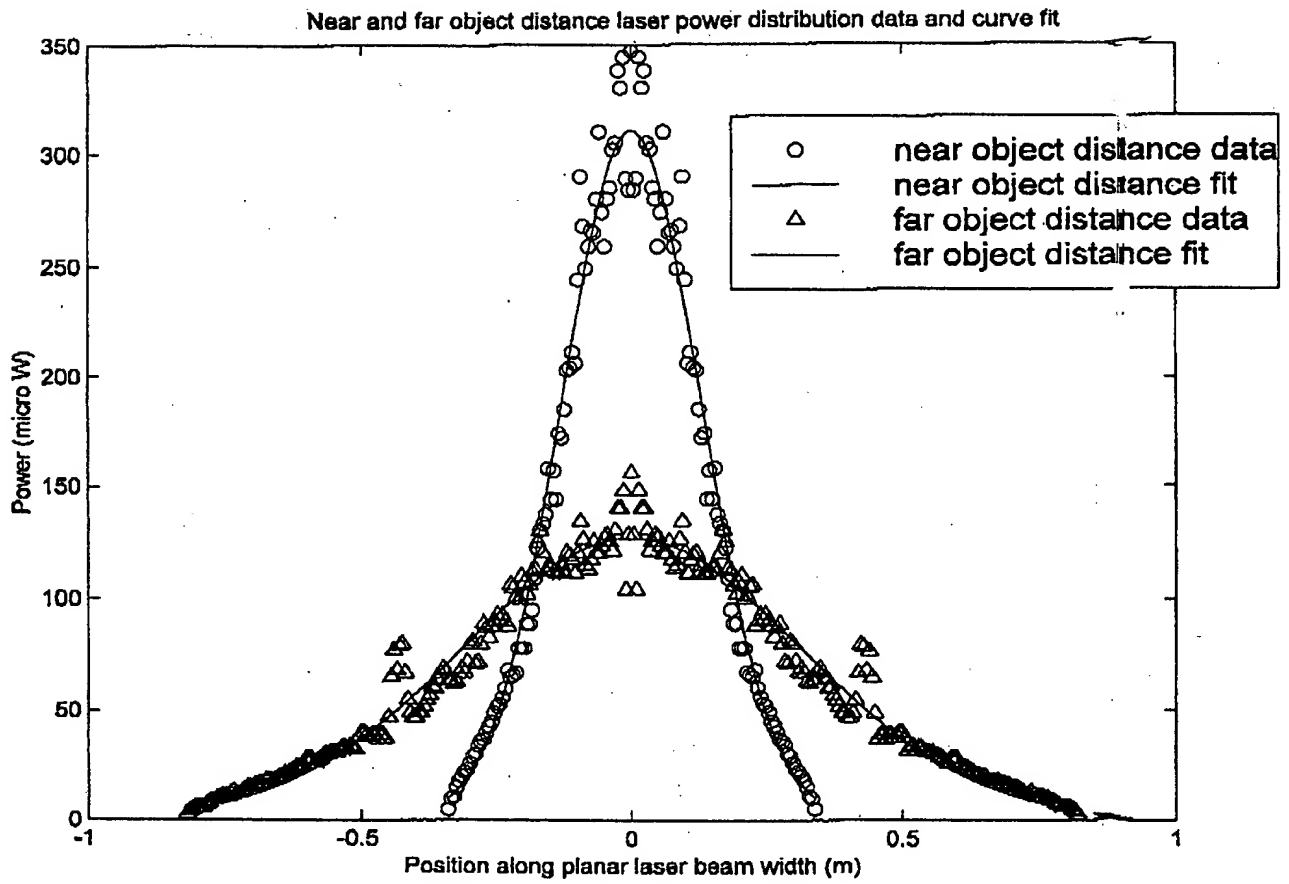


FIG. 1M2

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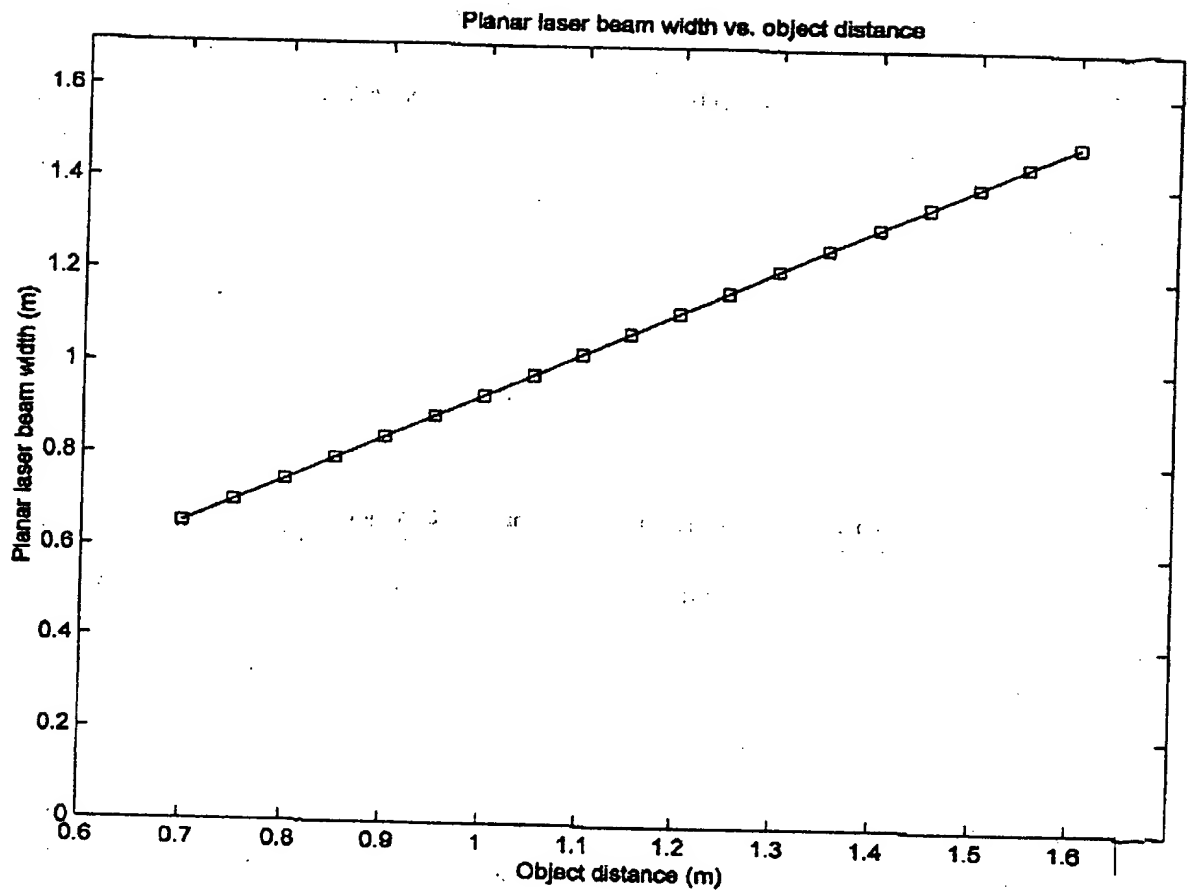


FIG. 1M3

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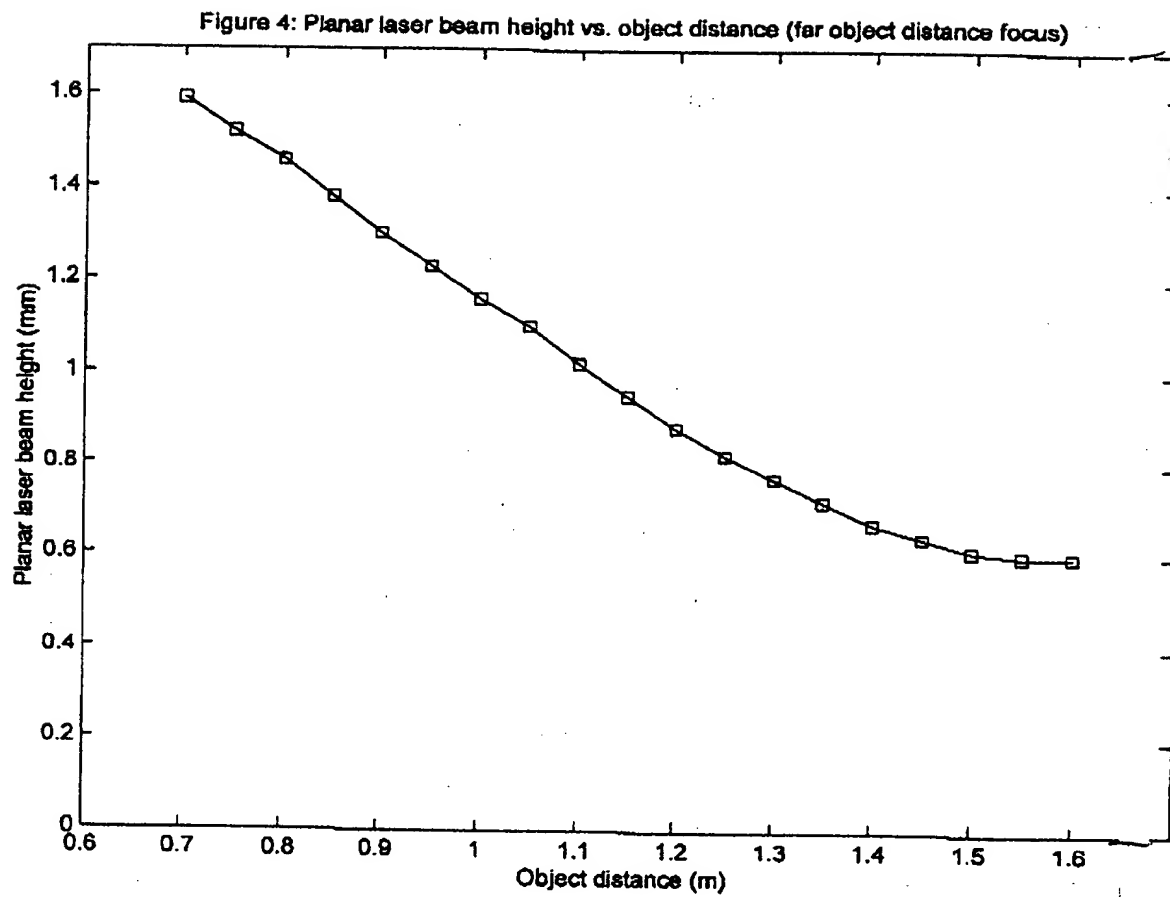


FIG 1M4

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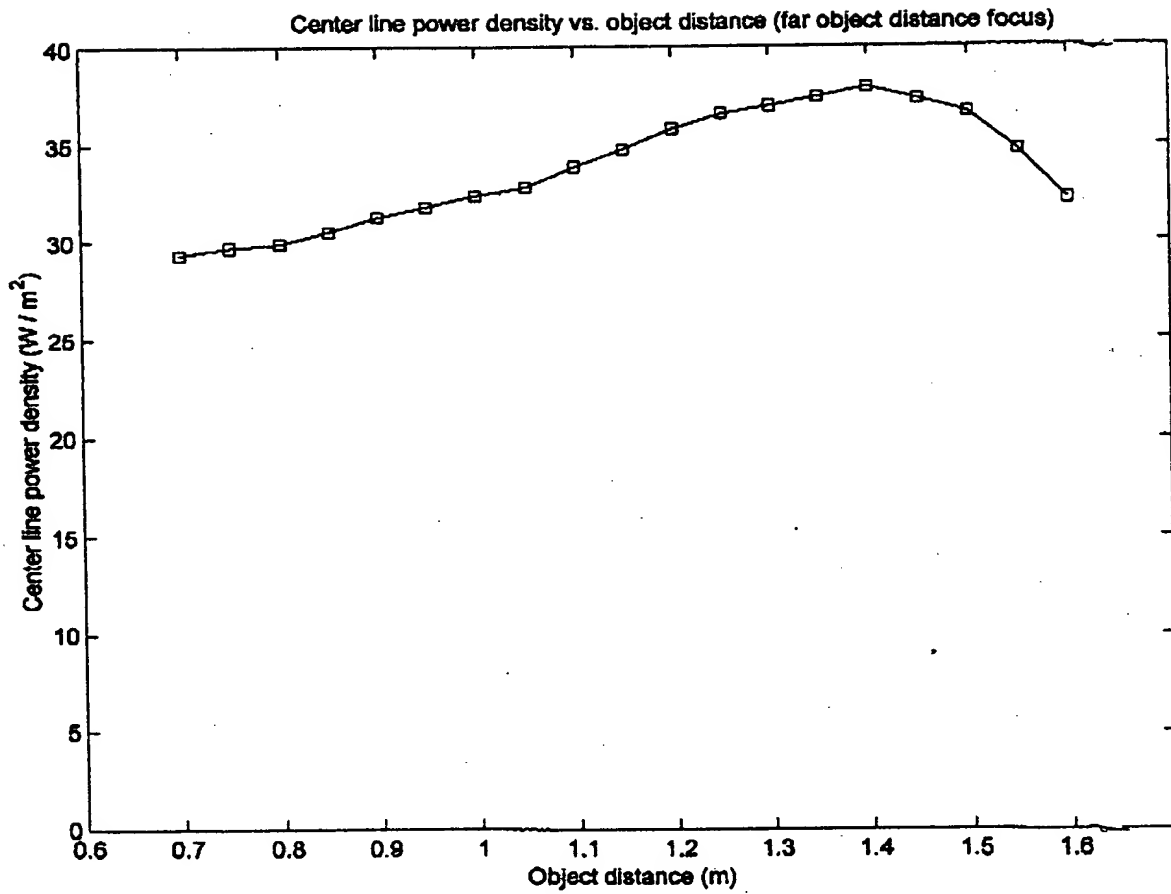


FIG. 1N

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Figure 6: Pixel power densities vs. object distance

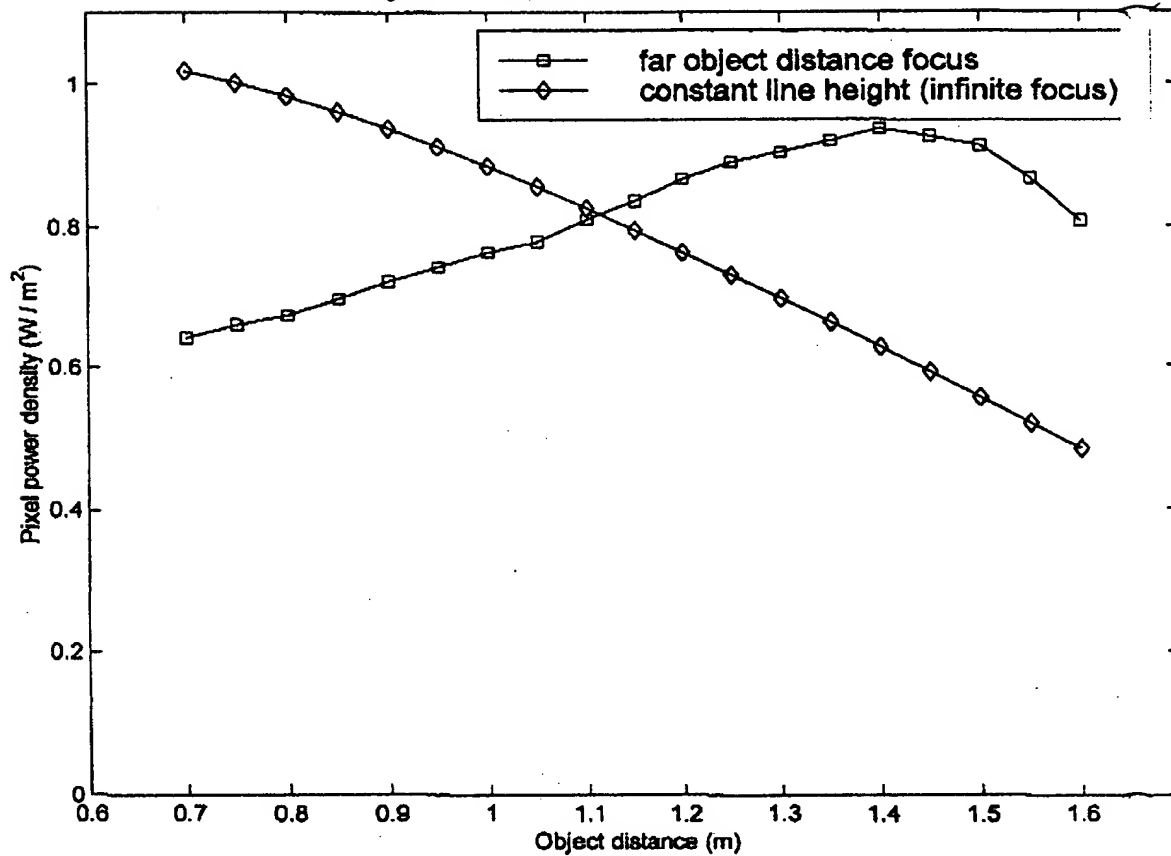


FIG. 10

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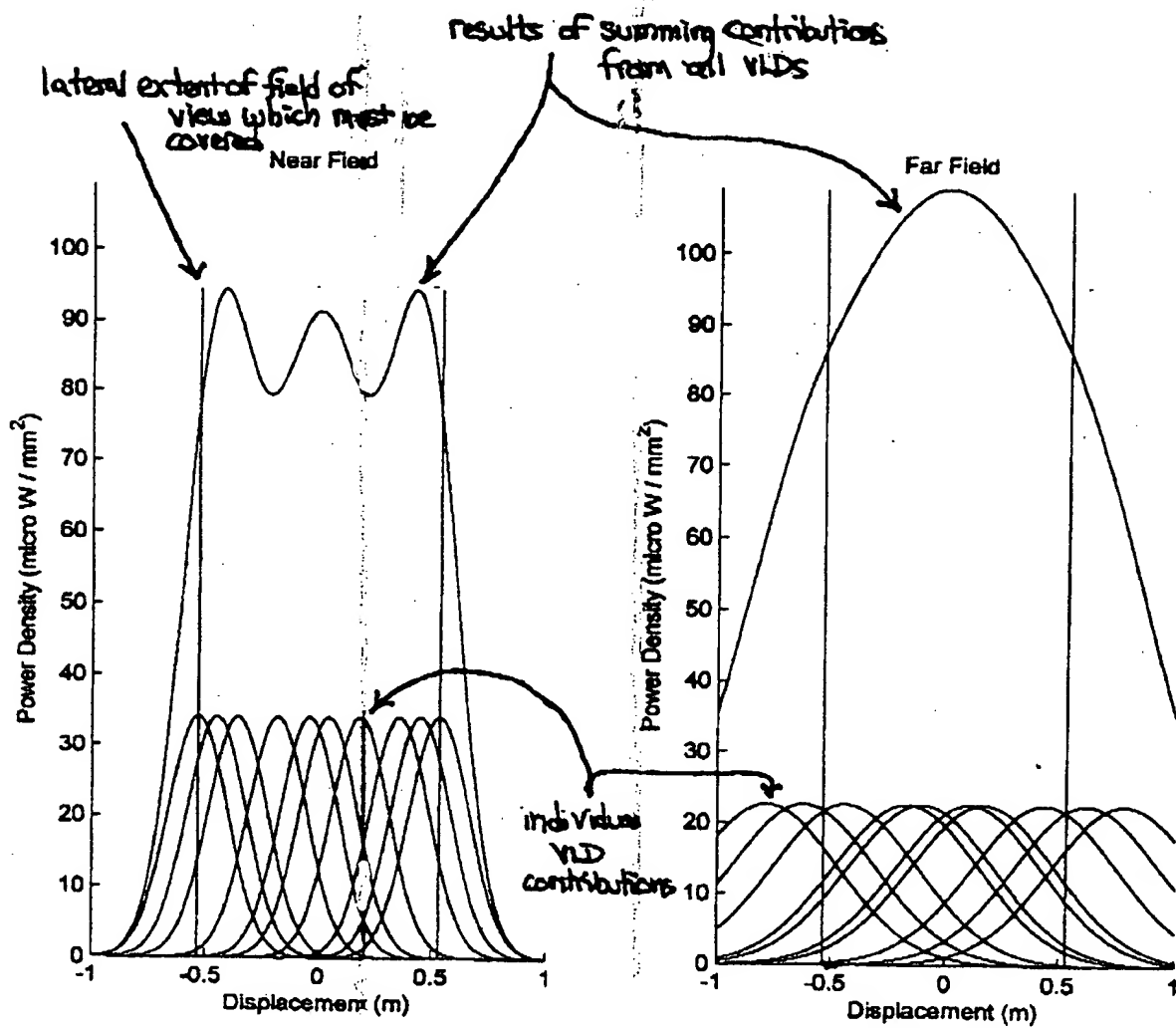


FIG 1P1

FIG 1P2

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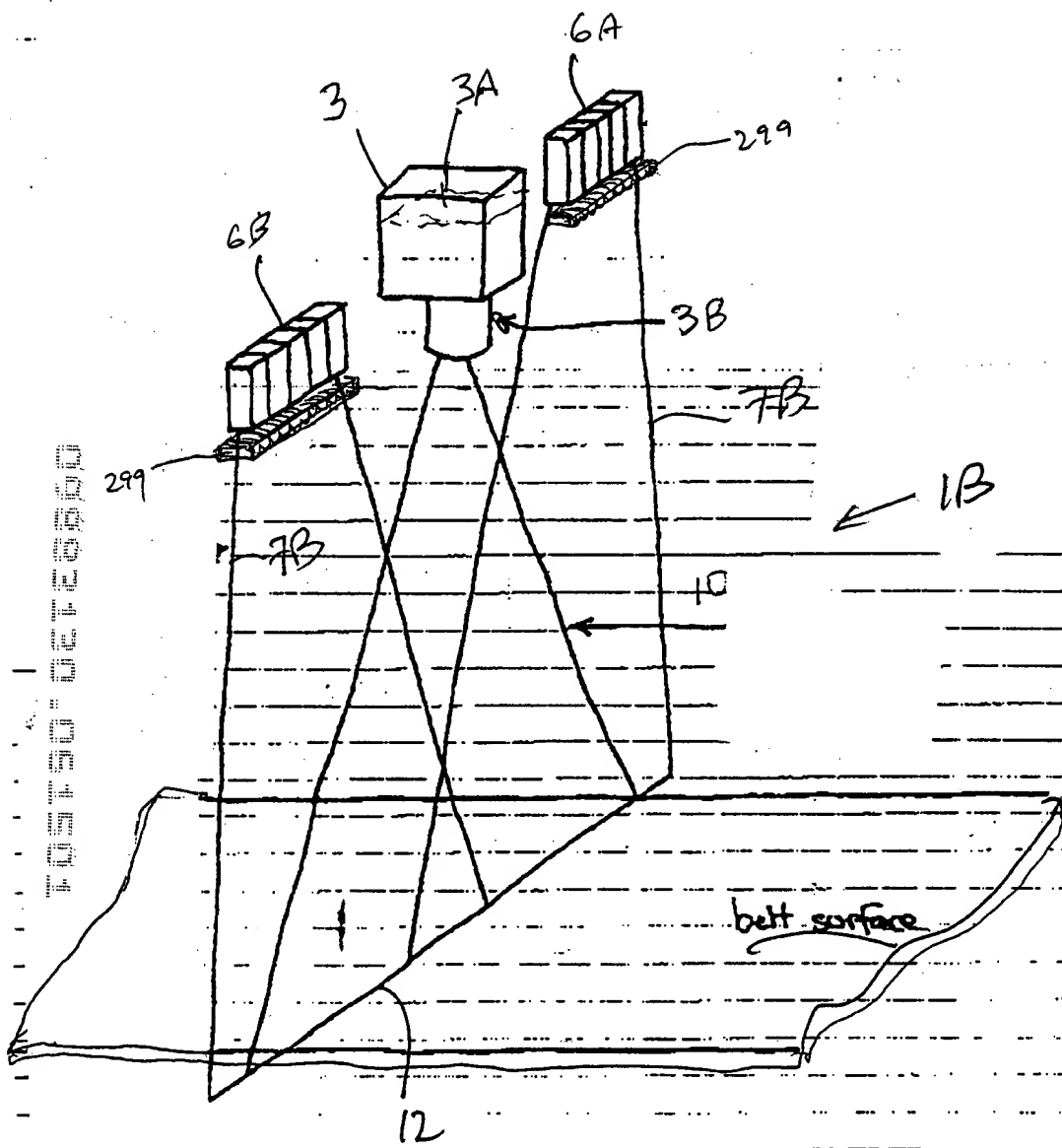
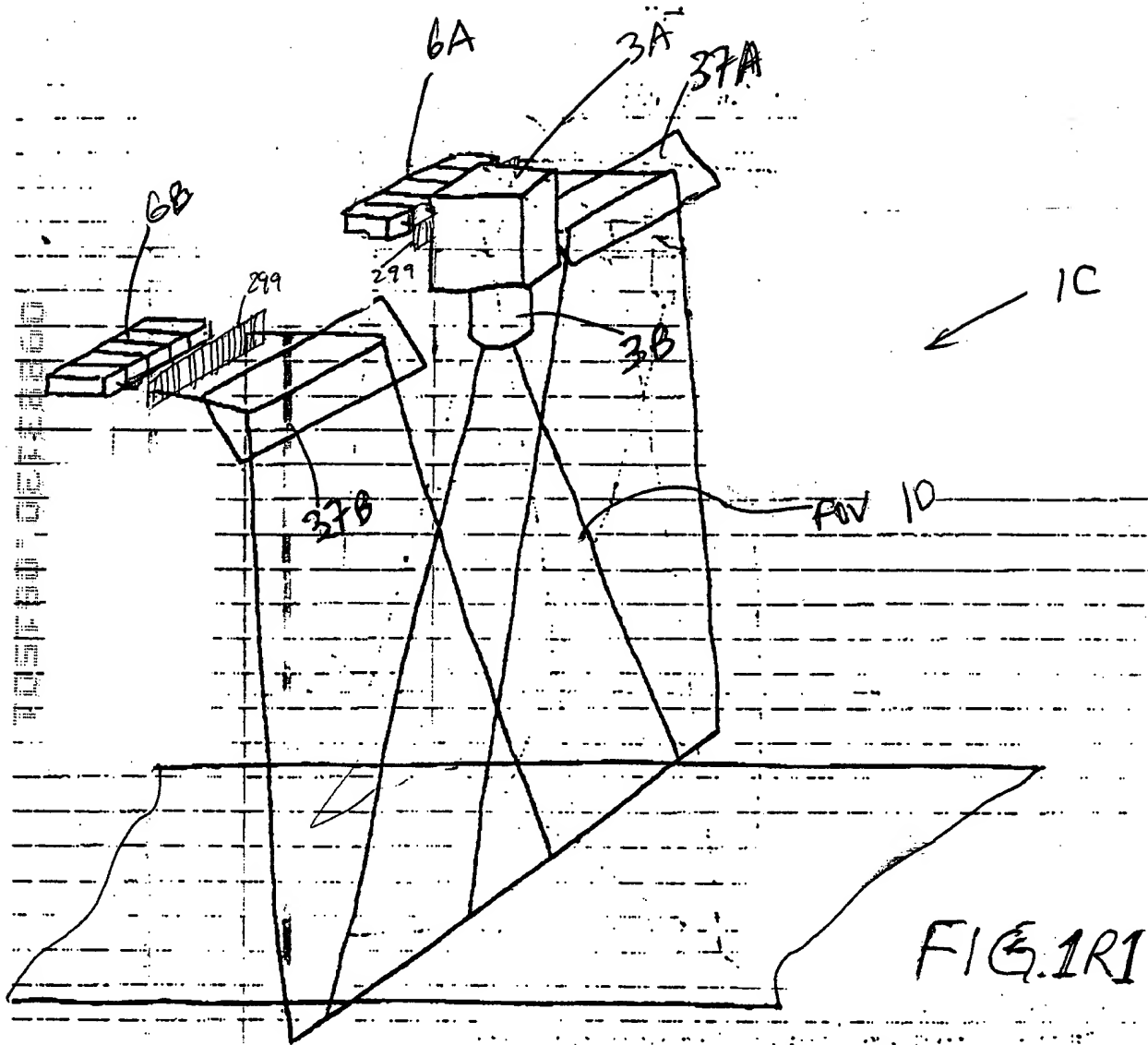


FIG. 101





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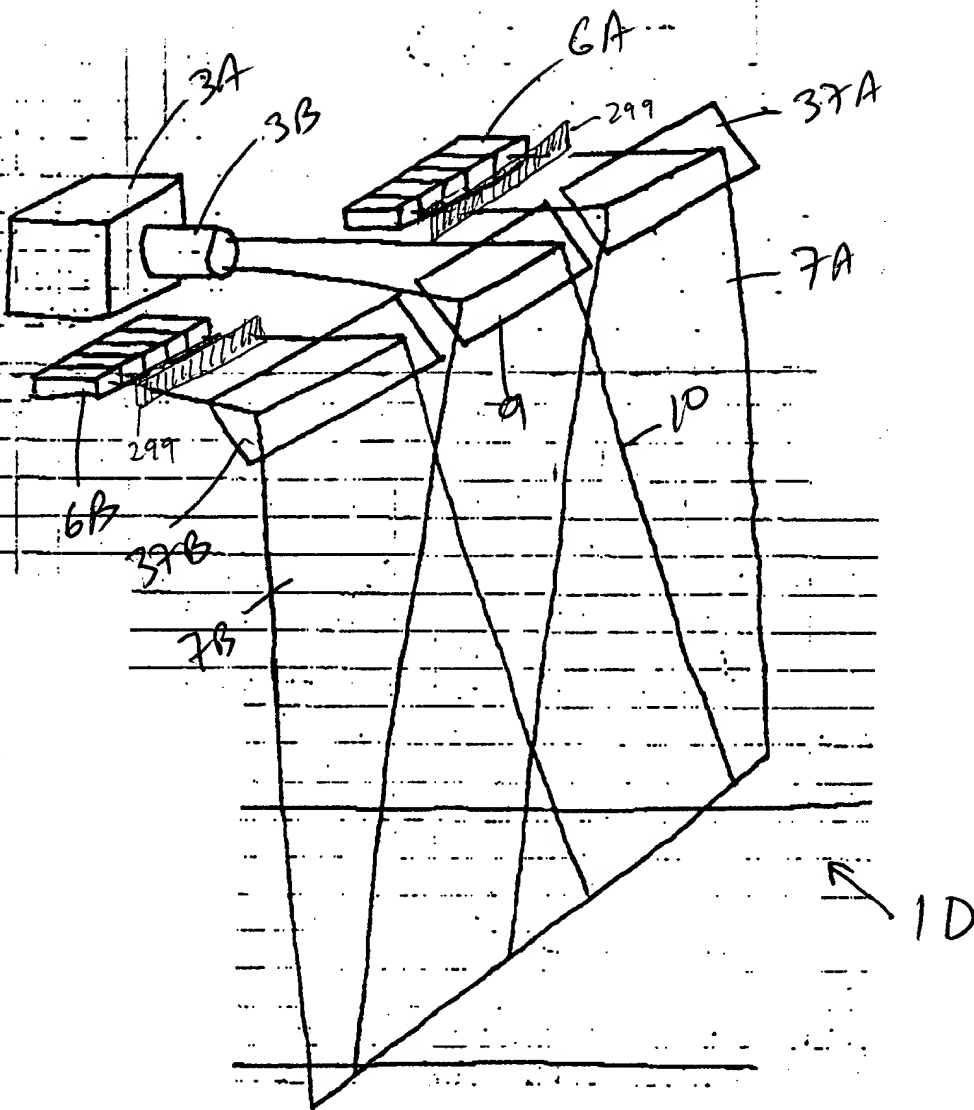
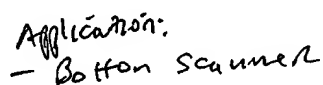


FIG. 1S1



1D



AGIT



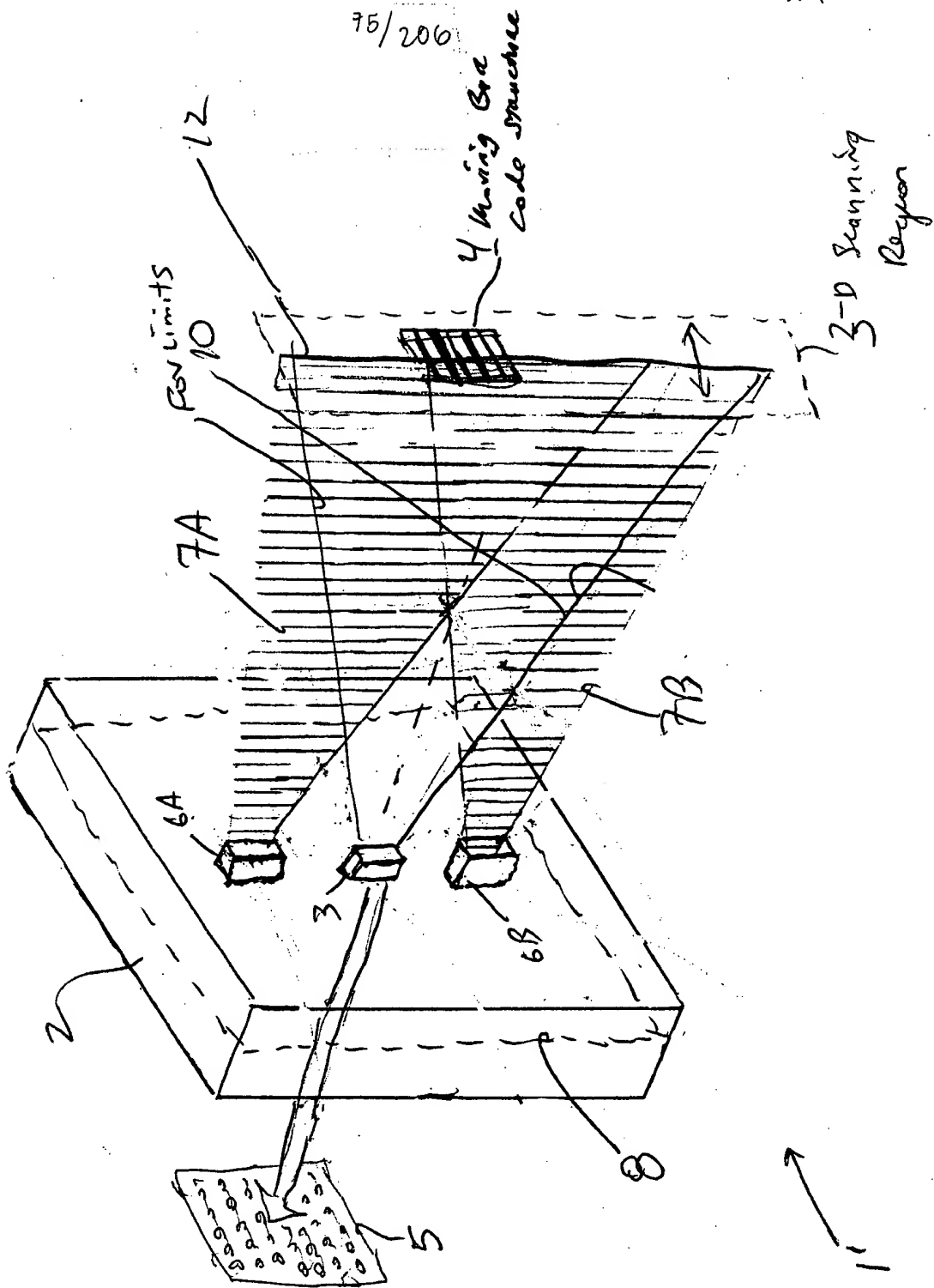


FIG. 1V1



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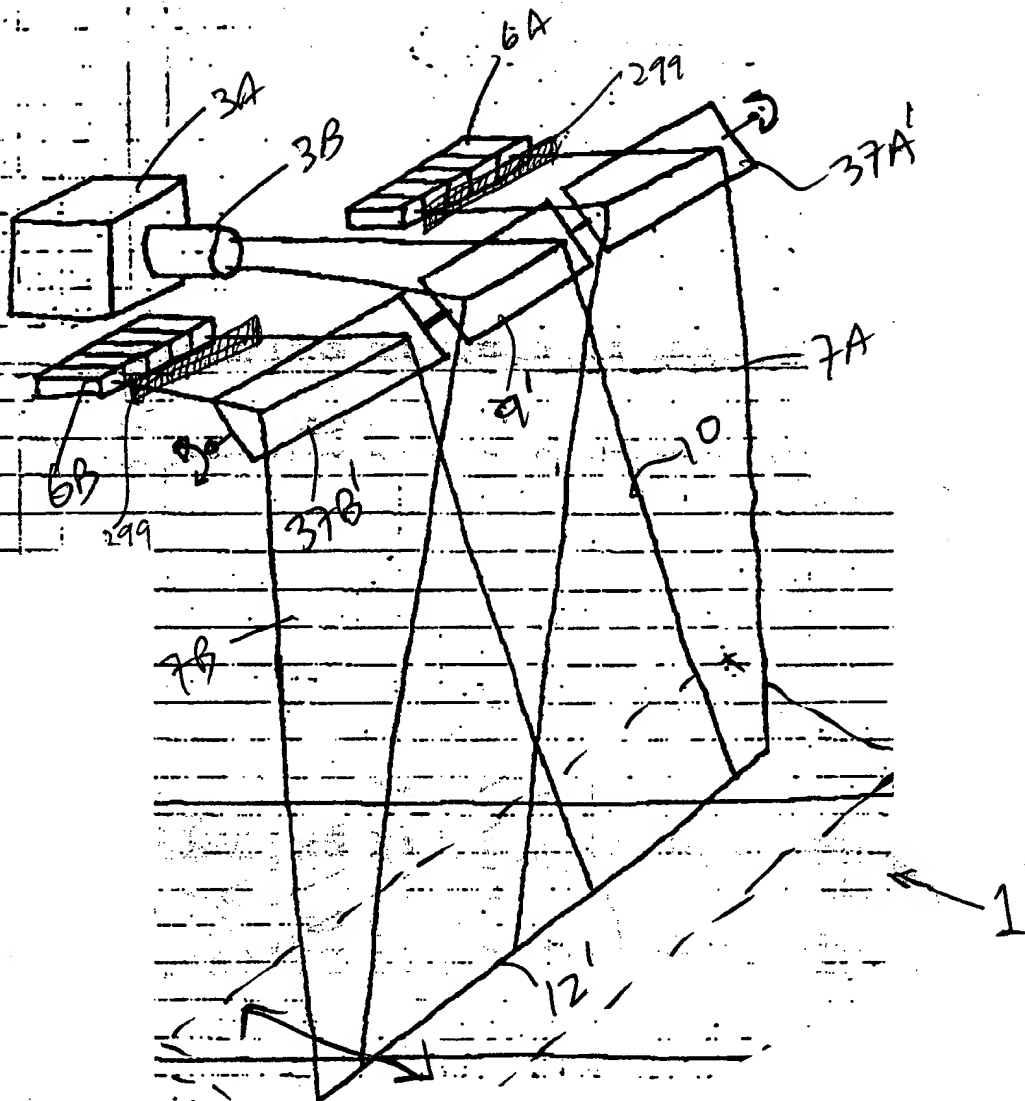
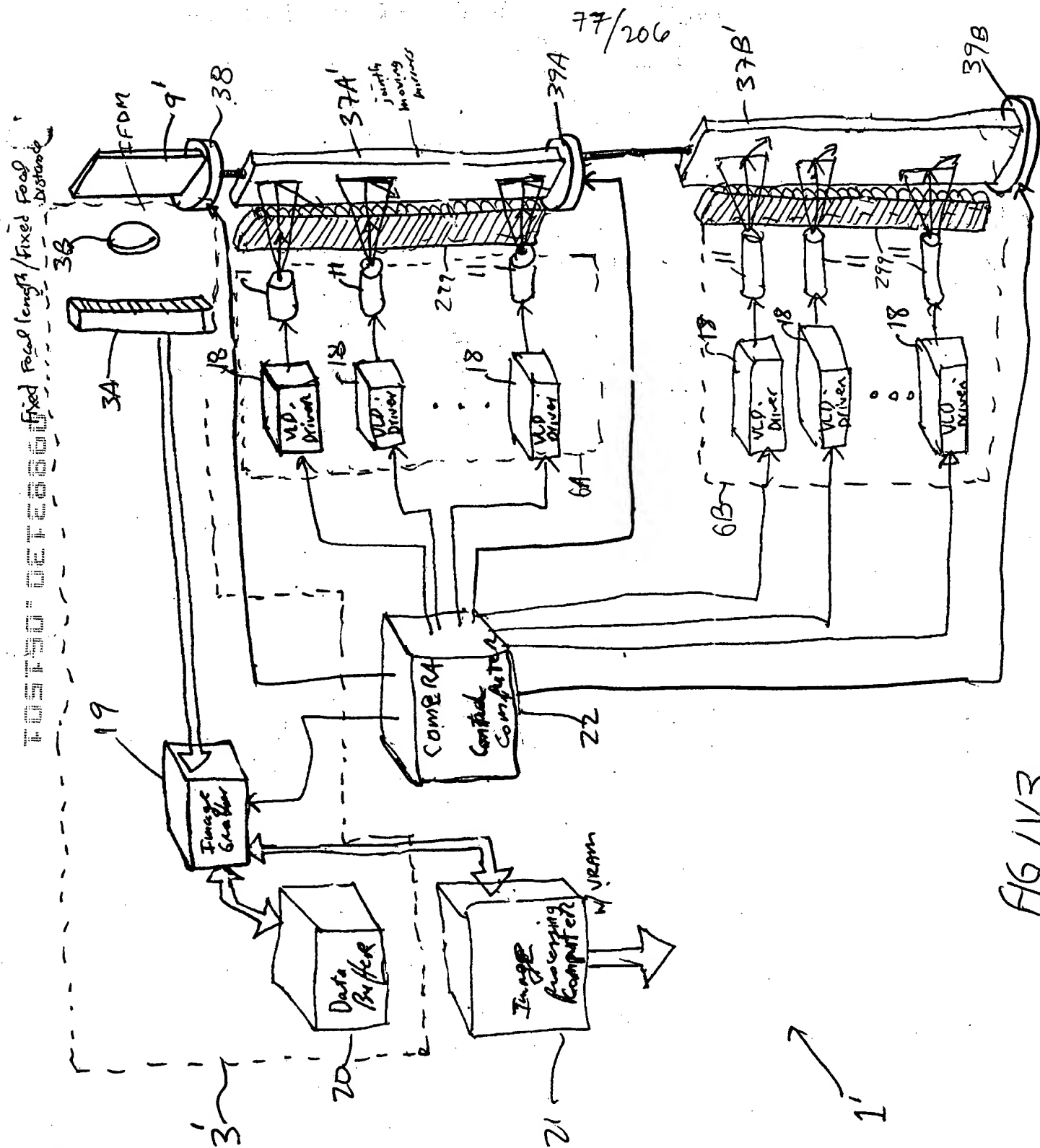


FIG. IV2



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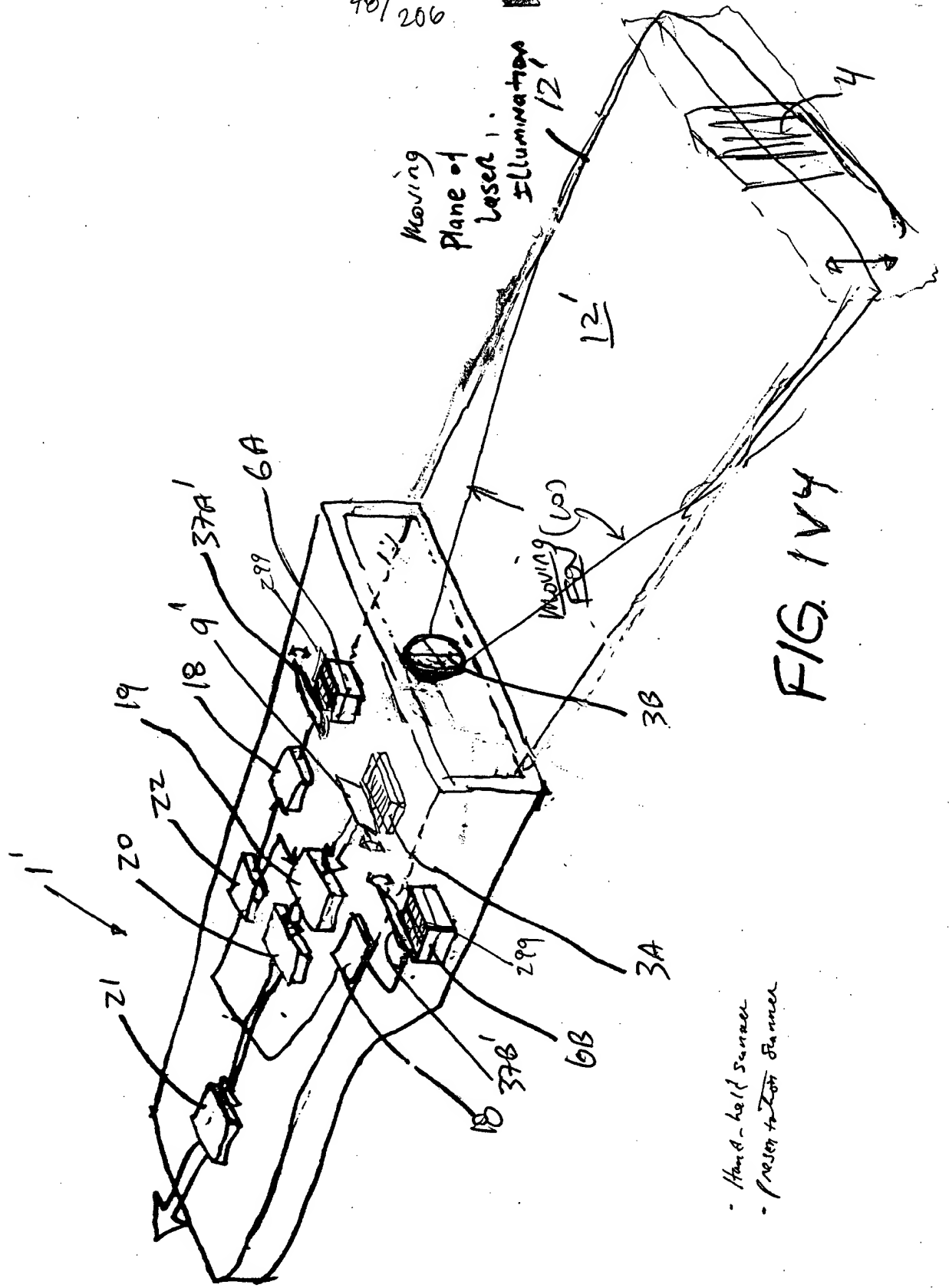


FIG. 1V4

- Hand-held Scanner
- Present to Left Scanner

Figure 1 consists of 12 diagrams, labeled (a) through (l), arranged in a single row. Each diagram shows a rectangular area divided into four quadrants by a vertical and a horizontal line. The quadrants contain different shapes: top-left has small circles, top-right has small squares, bottom-left has small triangles, and bottom-right has small diamonds. The diagrams illustrate a two-stage process where shapes move from left to right across the quadrants. In the first stage, shapes appear in the top-left and bottom-left quadrants. In the second stage, shapes appear in the top-right and bottom-right quadrants. The diagrams show the progression of these shapes from left to right across the quadrants, with some shapes appearing in multiple quadrants. The diagrams are labeled (a) through (l) at the bottom.

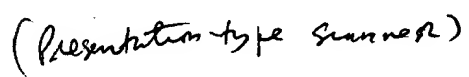


FIG. 1 V5

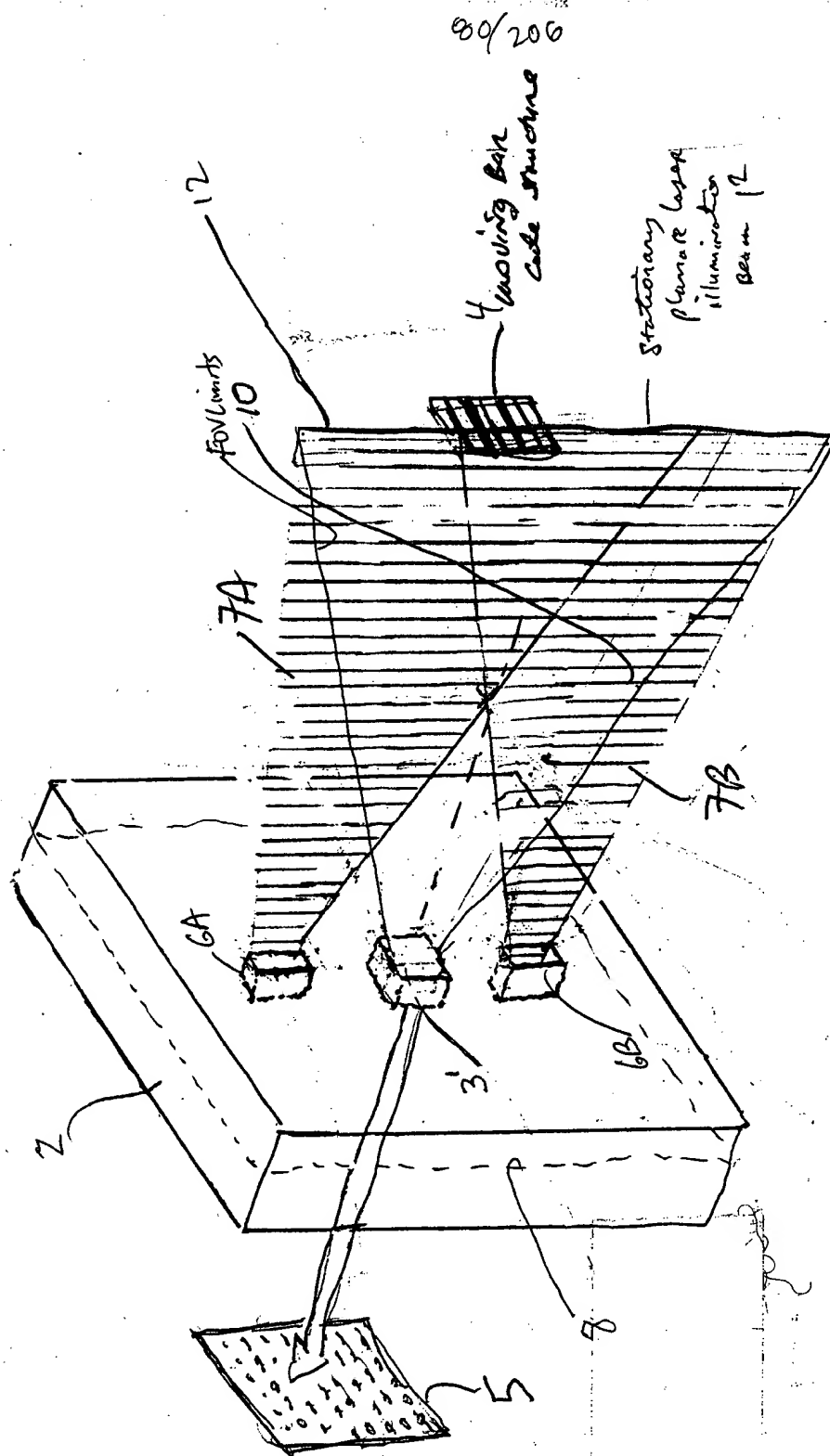


FIG. 2A

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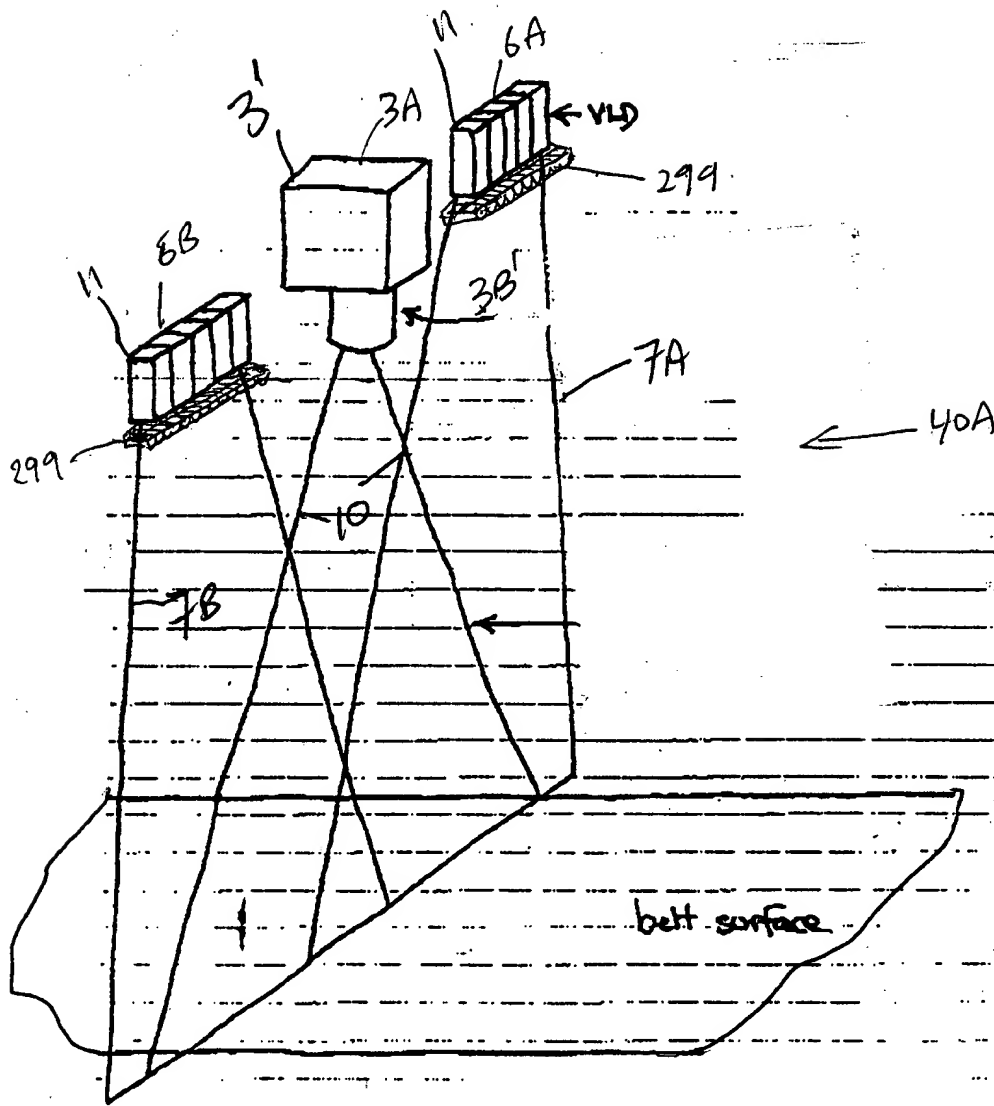


FIG. 2 B1

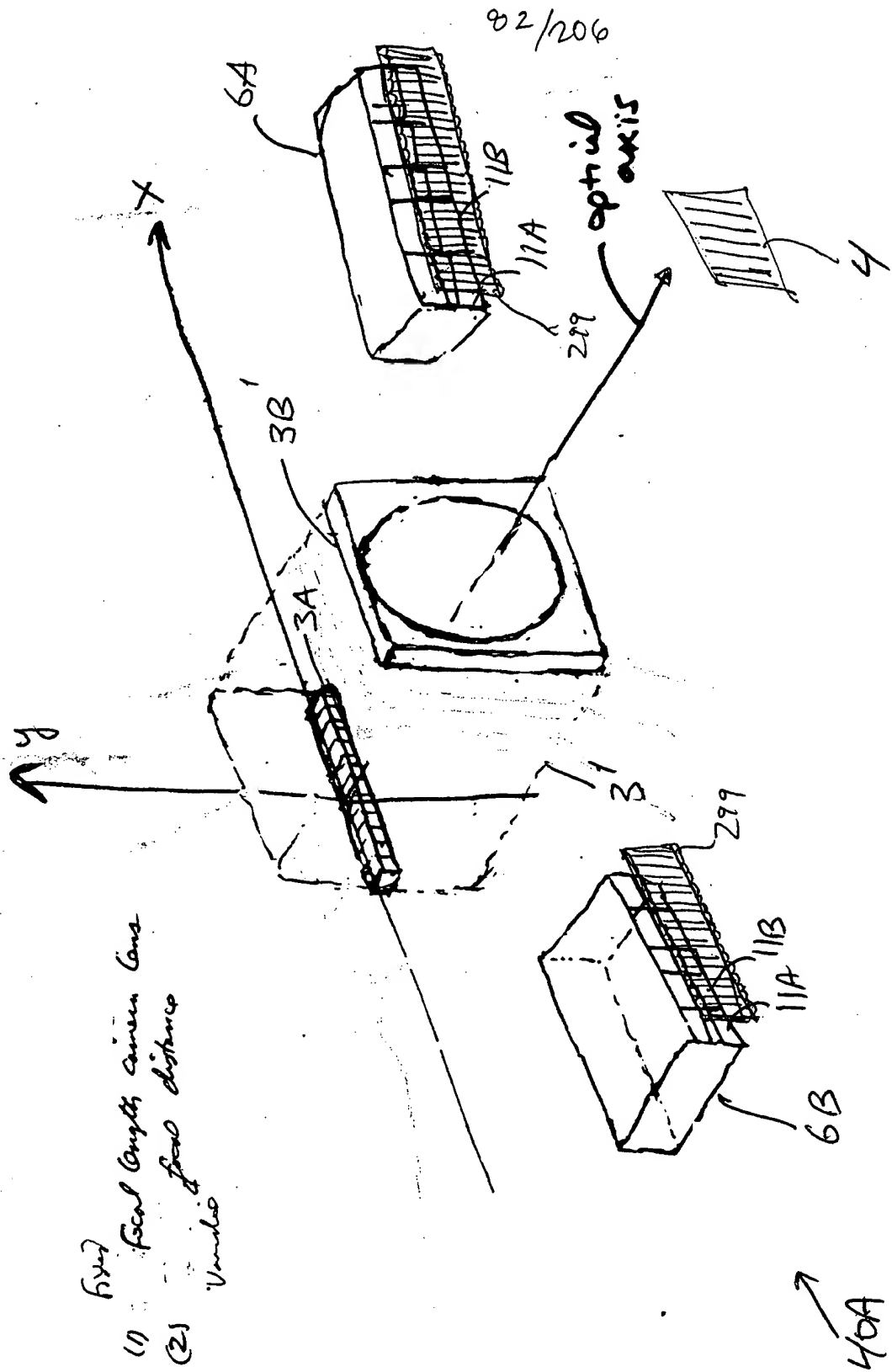


FIG. 2B2

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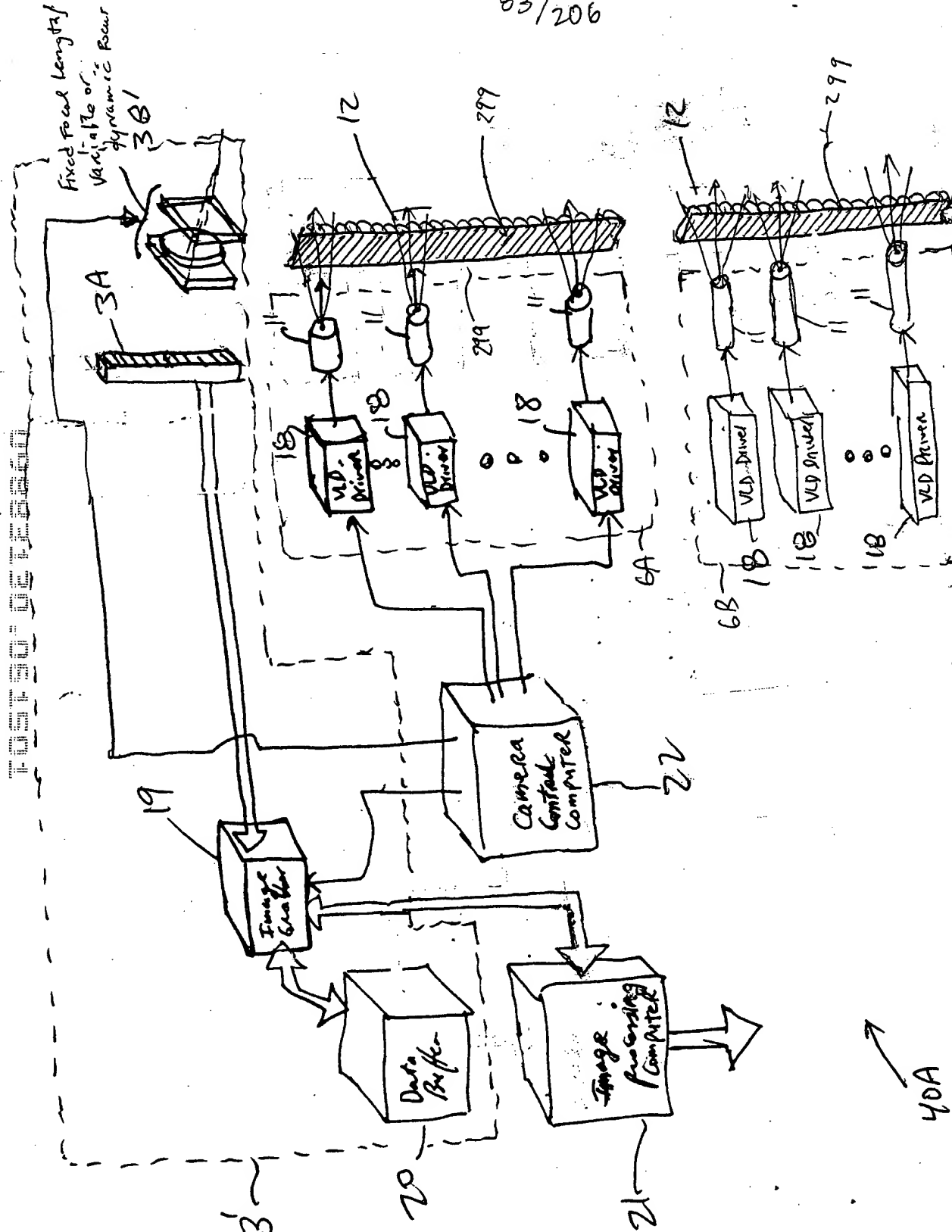


FIG. 2C1



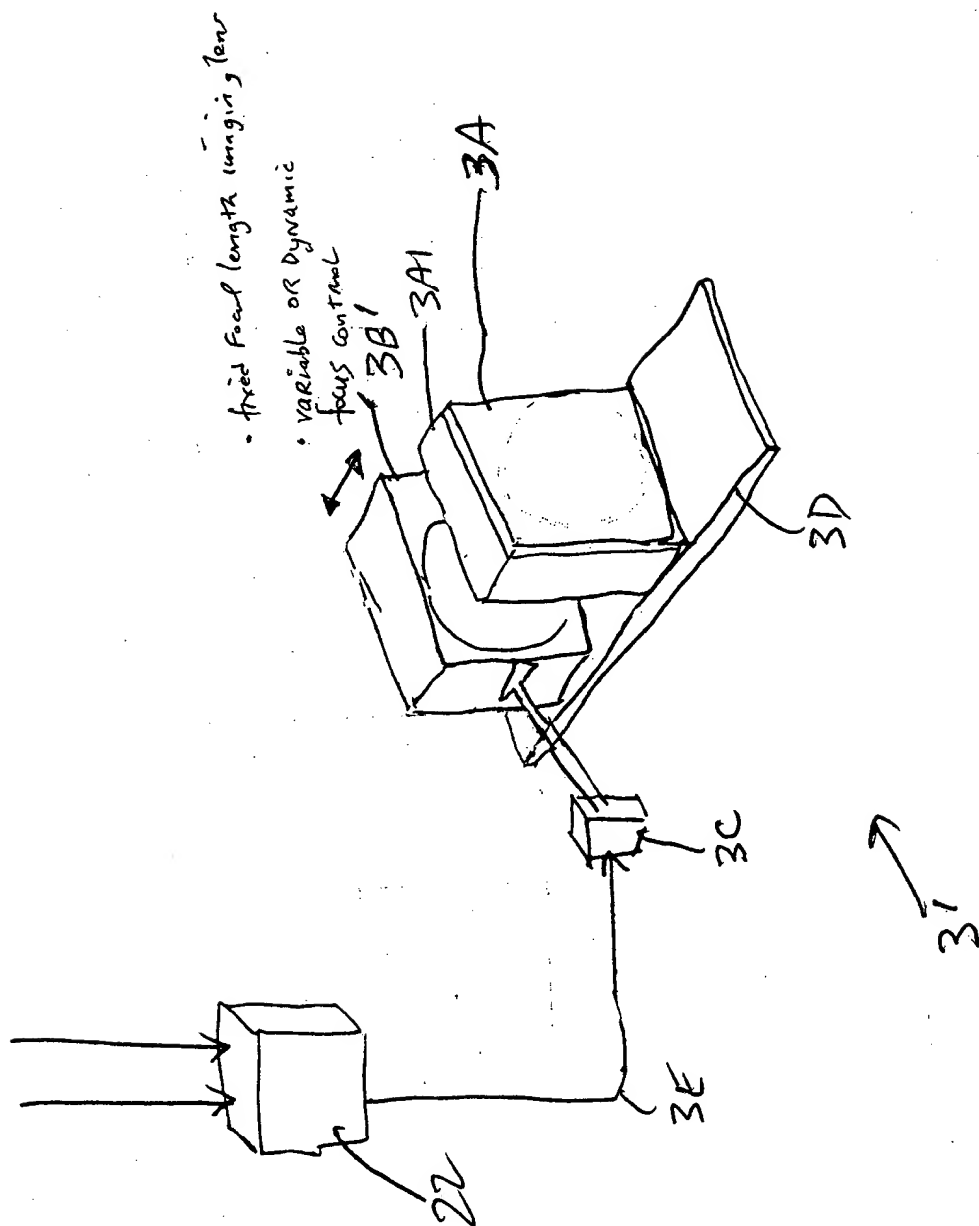


FIG. 2C2

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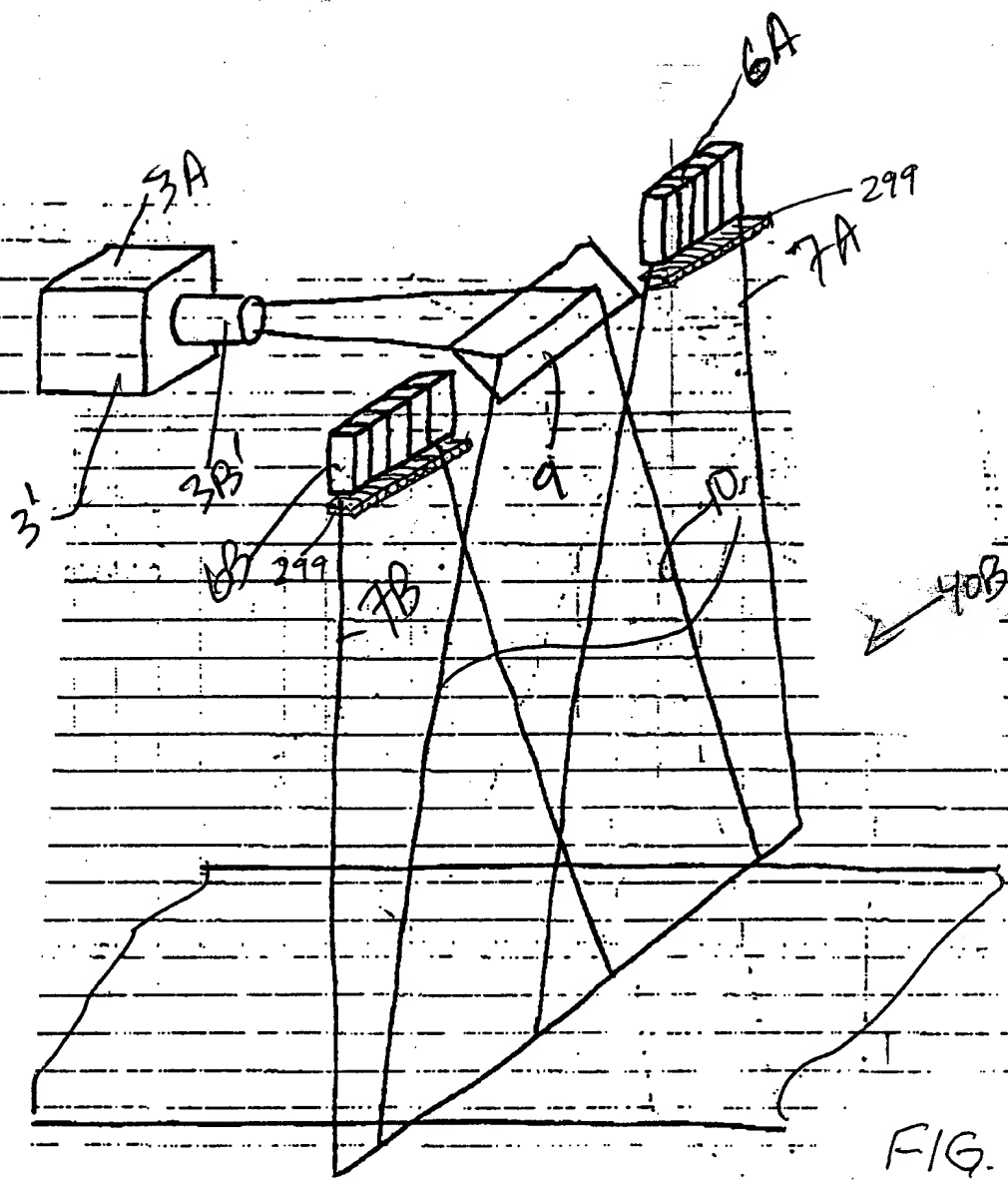


FIG. 2D1

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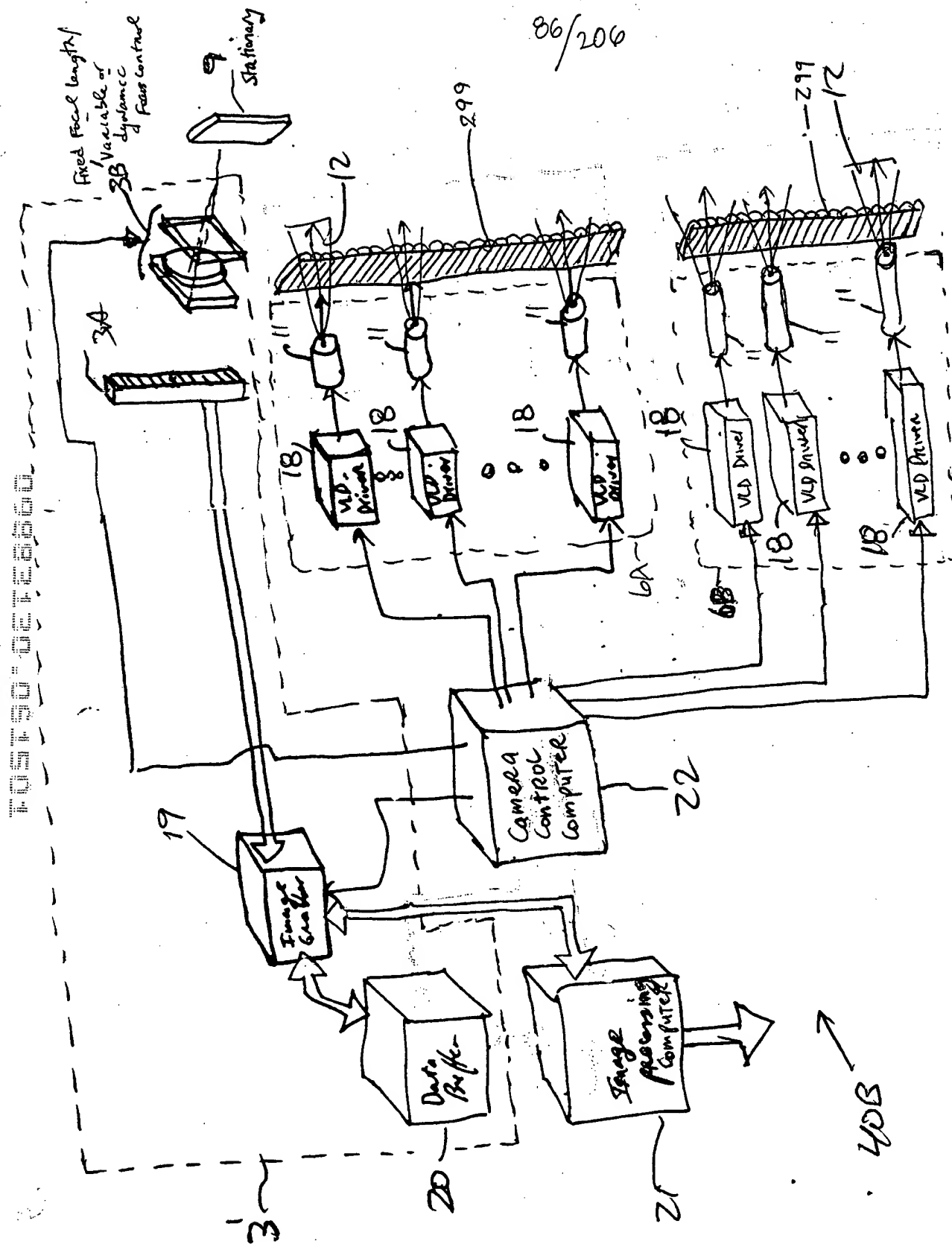


FIG. 2D2

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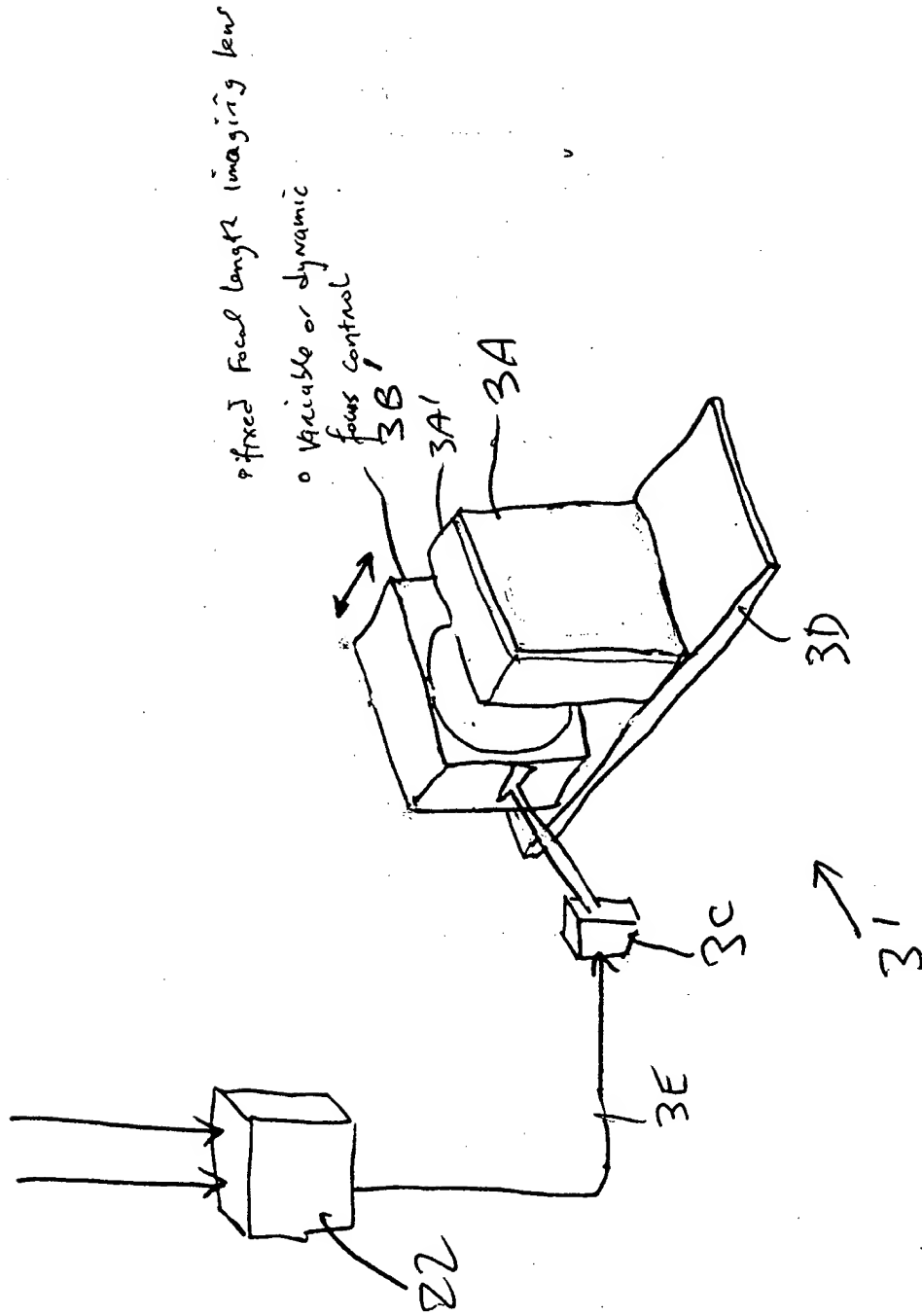


FIG. 2D3

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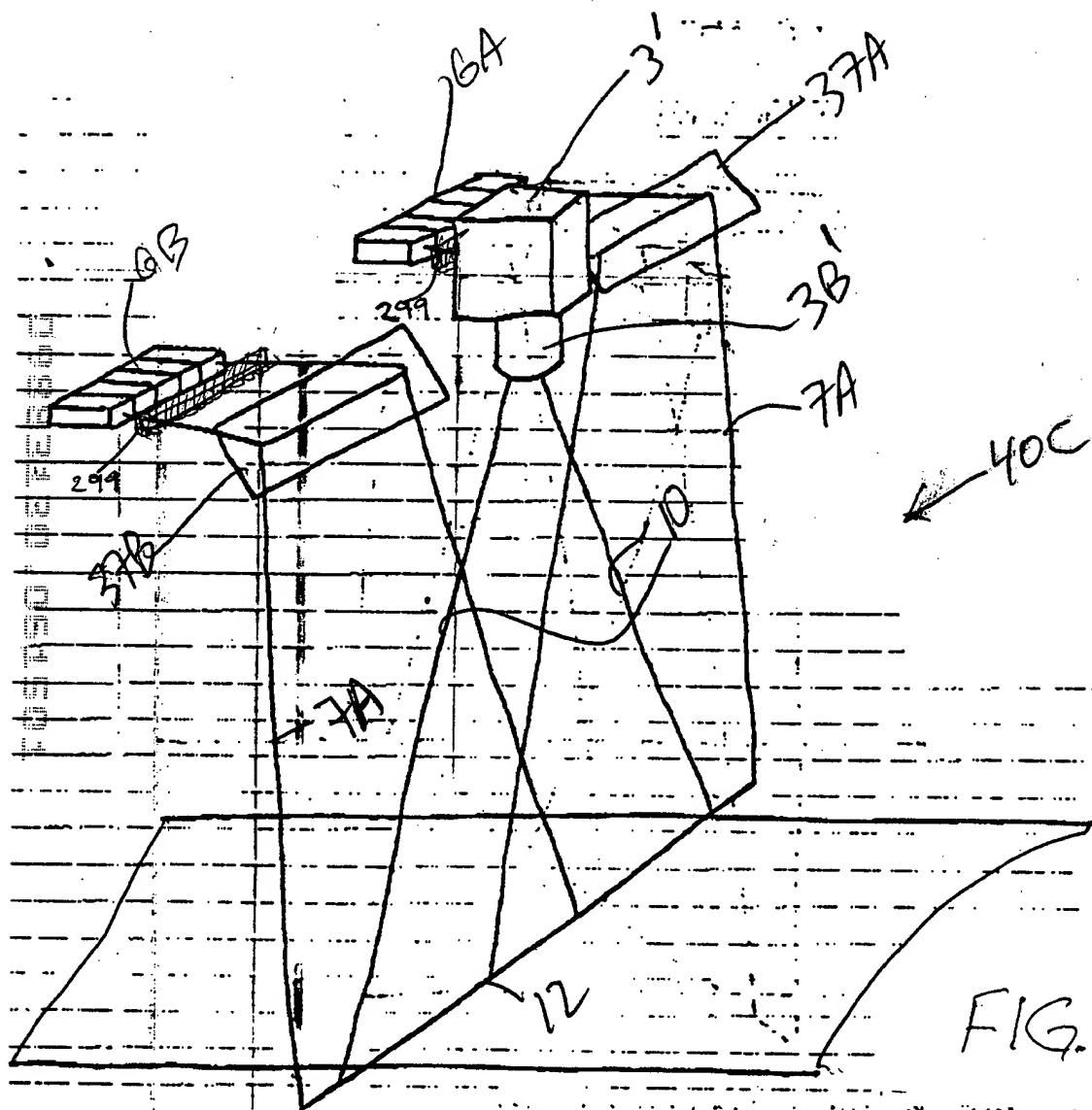


FIG. 2E1

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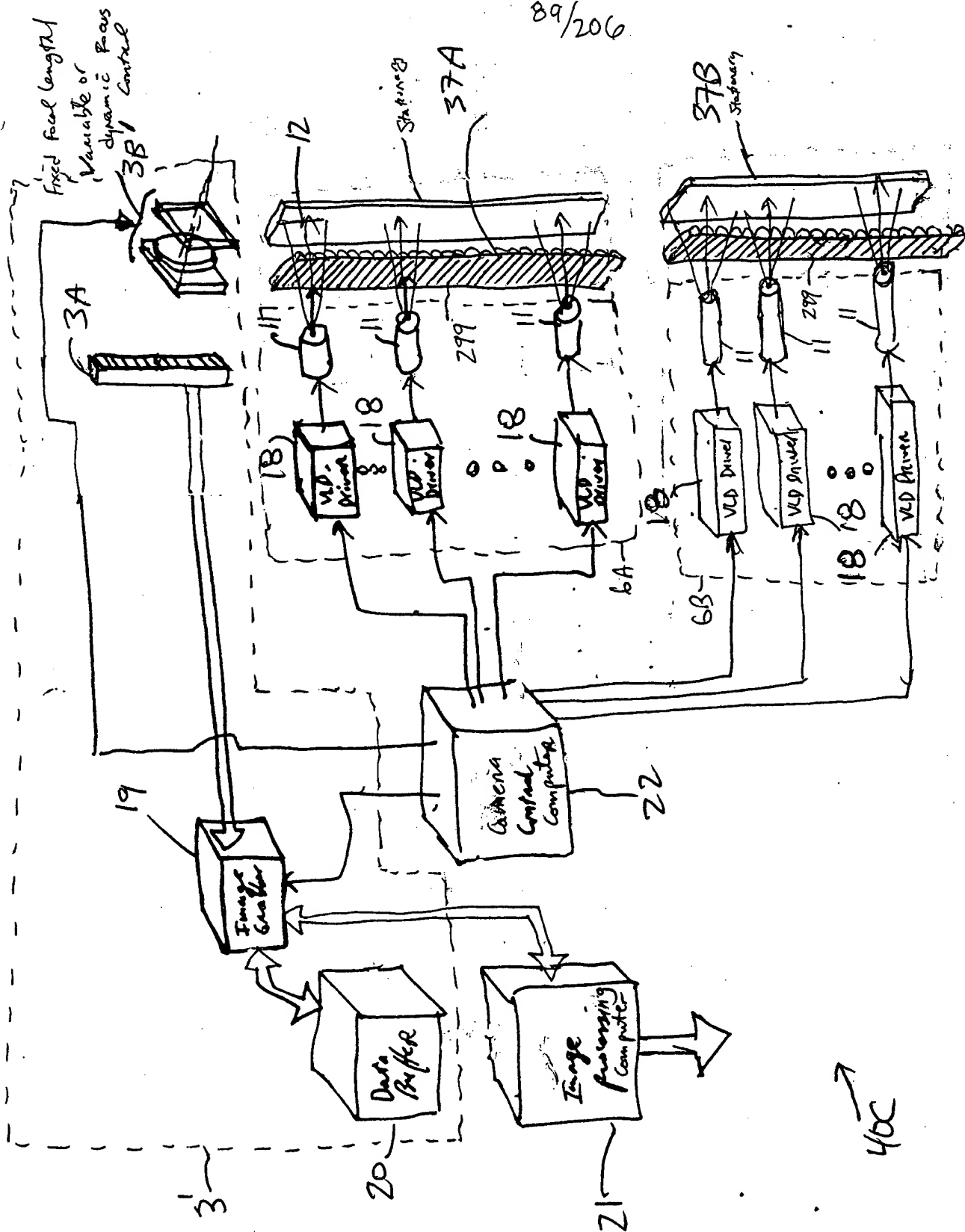


FIG. 2E2

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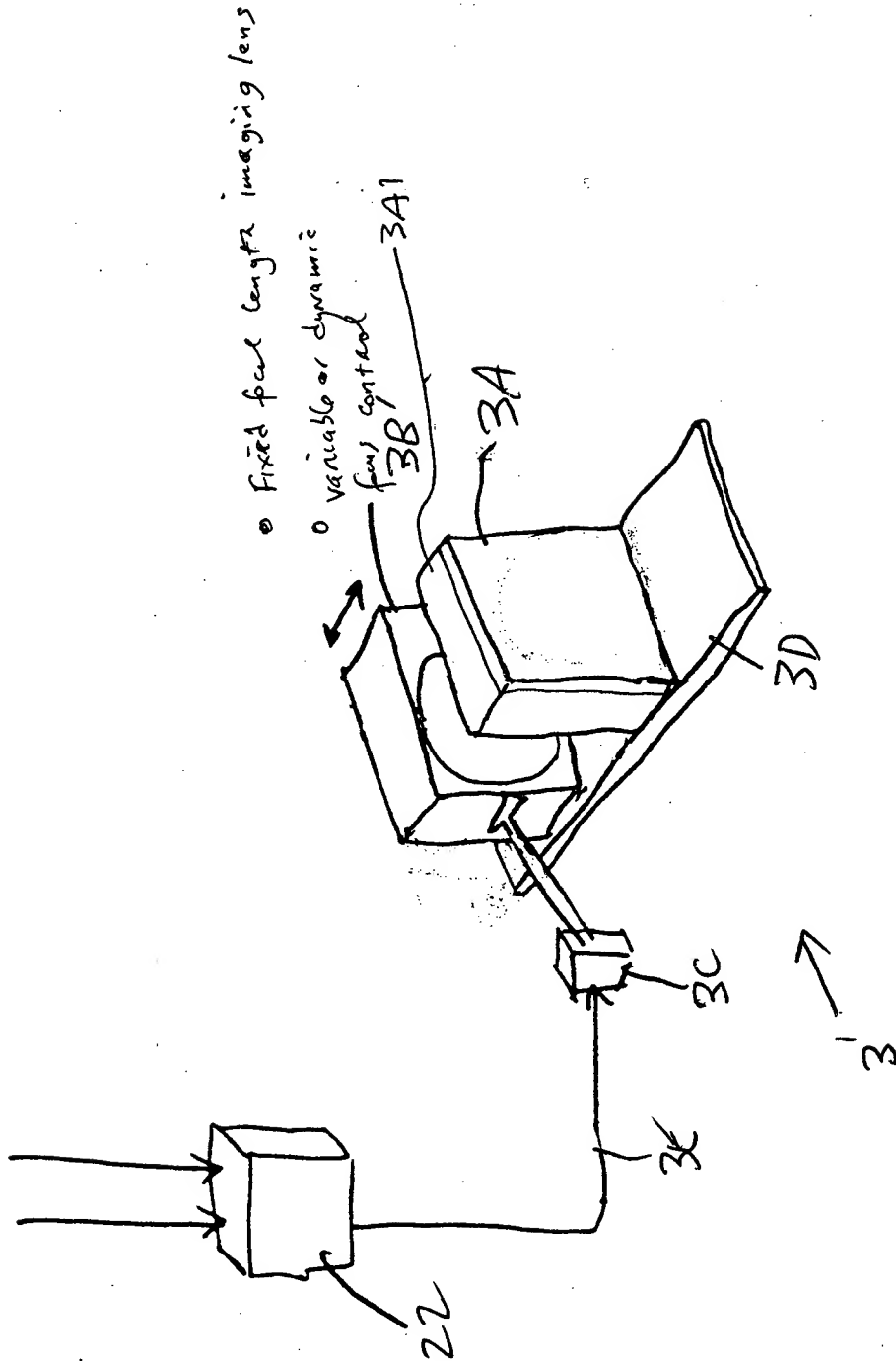


FIG. 2E3

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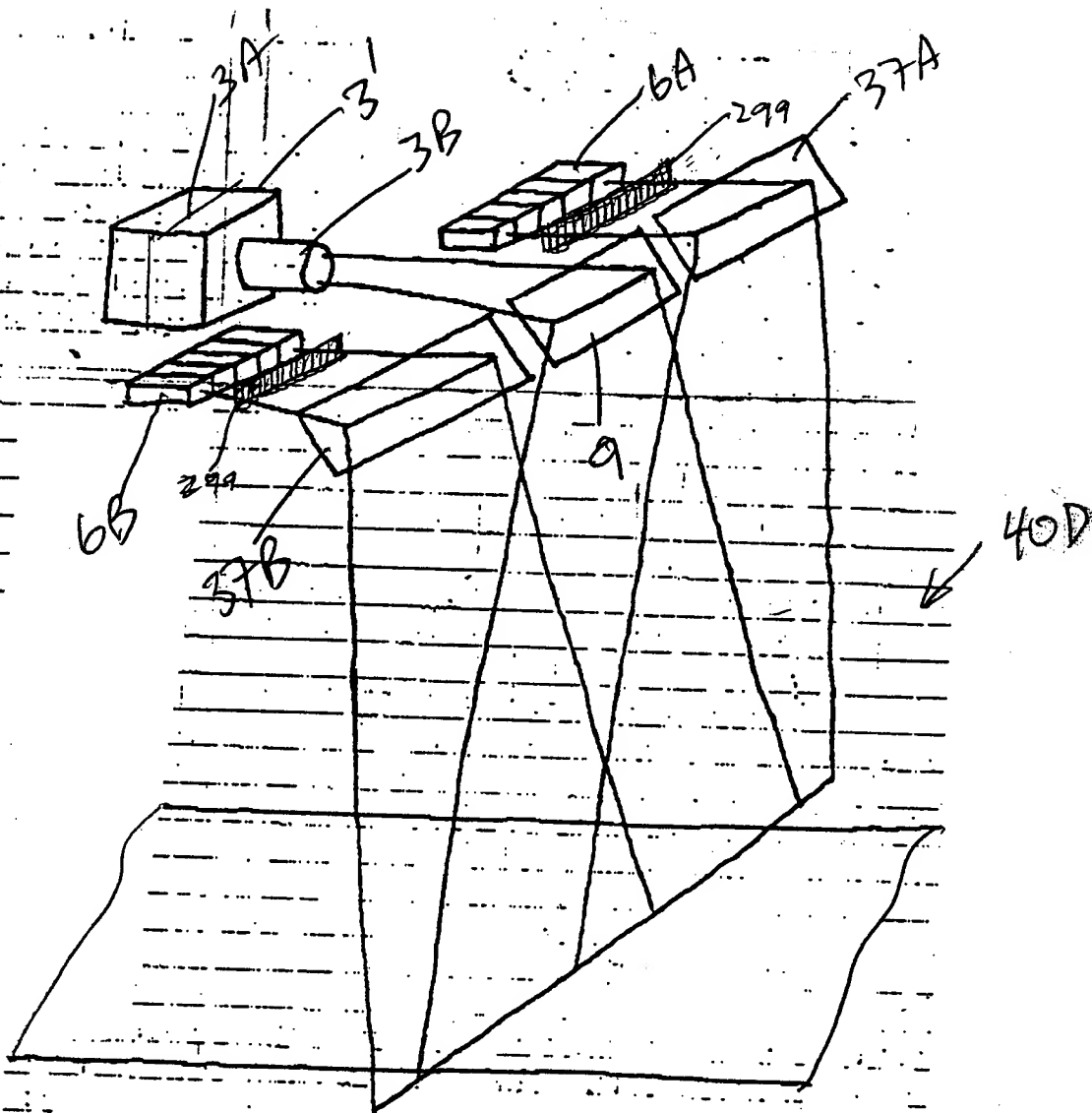


FIG. 2F1



FOI 90-022256P

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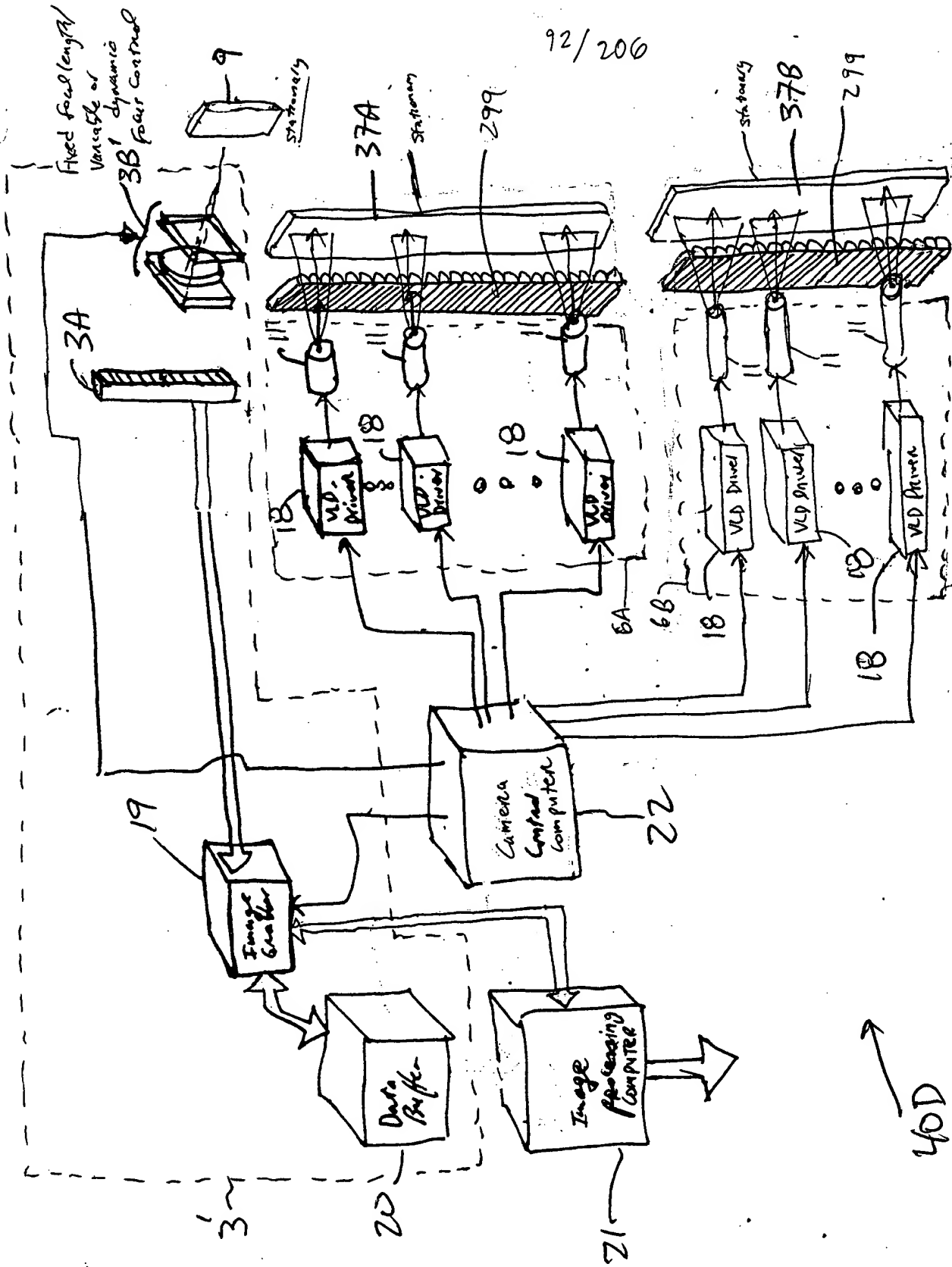


FIG 2F2

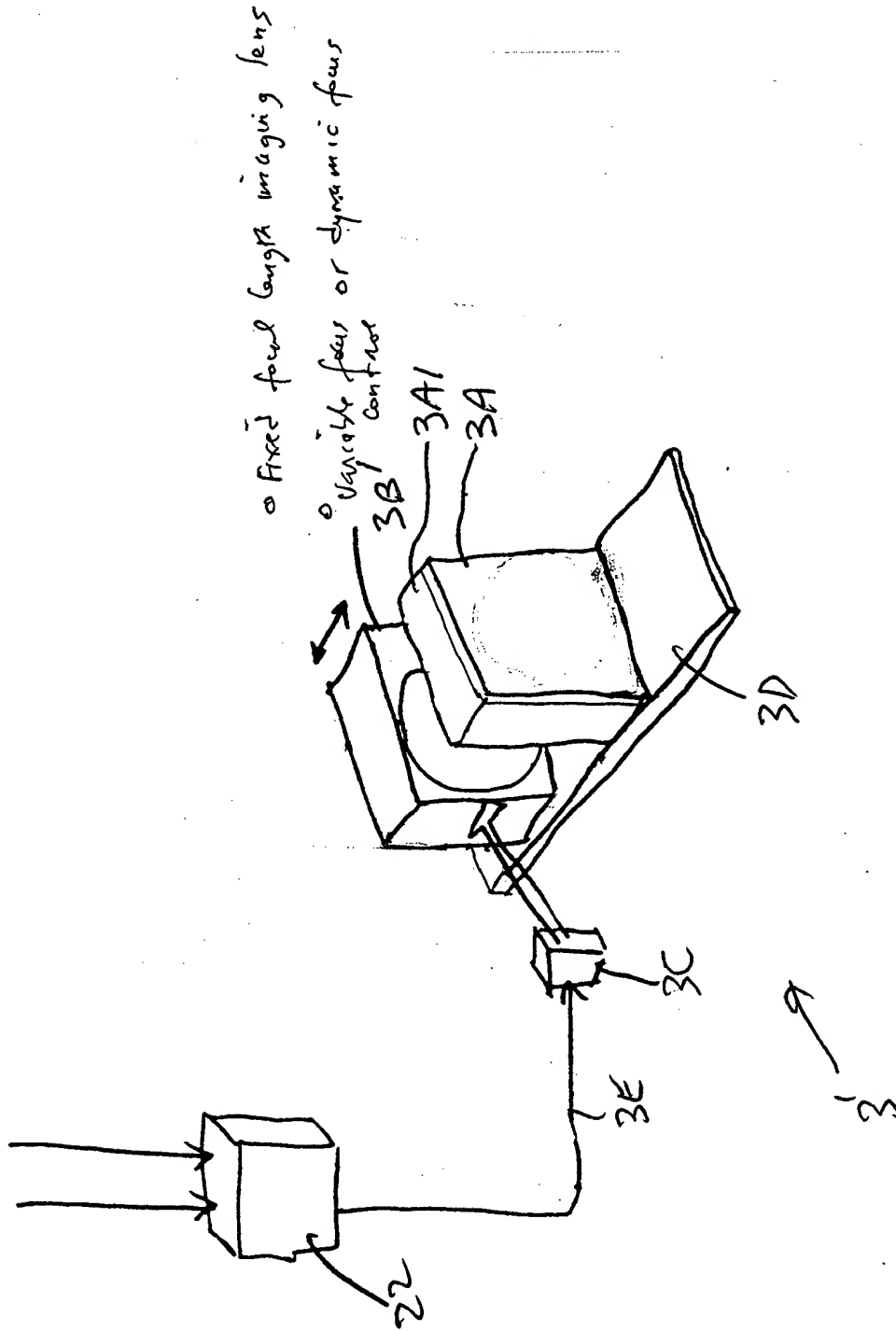


FIG. 2F3

Top Conveyor Scanner:

- fixed focal length imaging lens
- variable focal distance control

Side Conveyor Scanner:

- fixed focal length imaging lens
- dynamic focal distance control

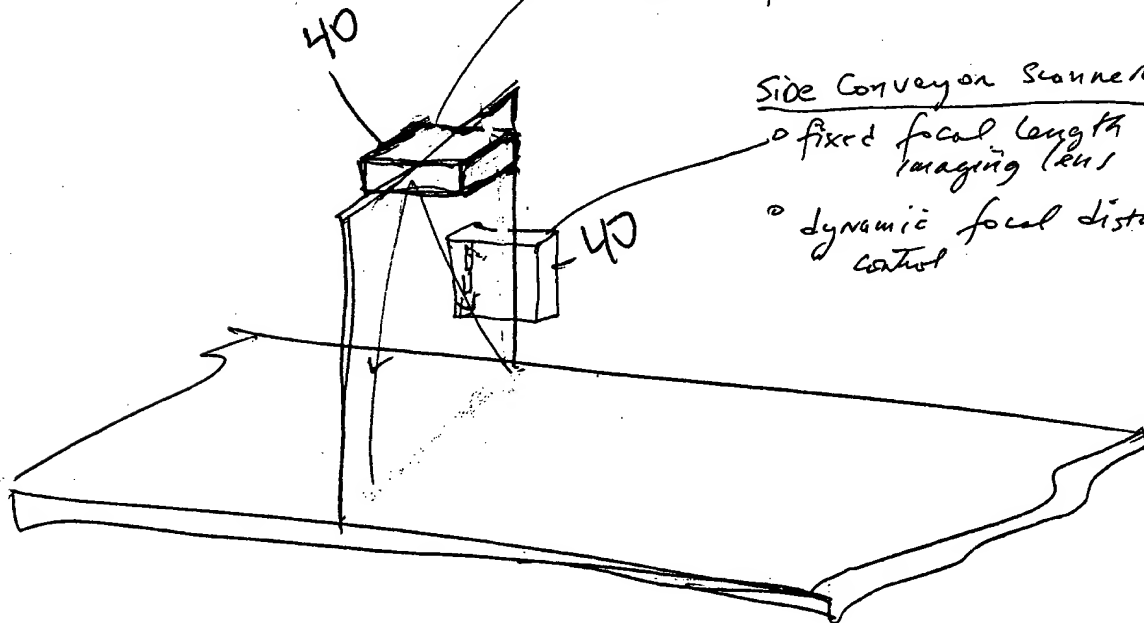
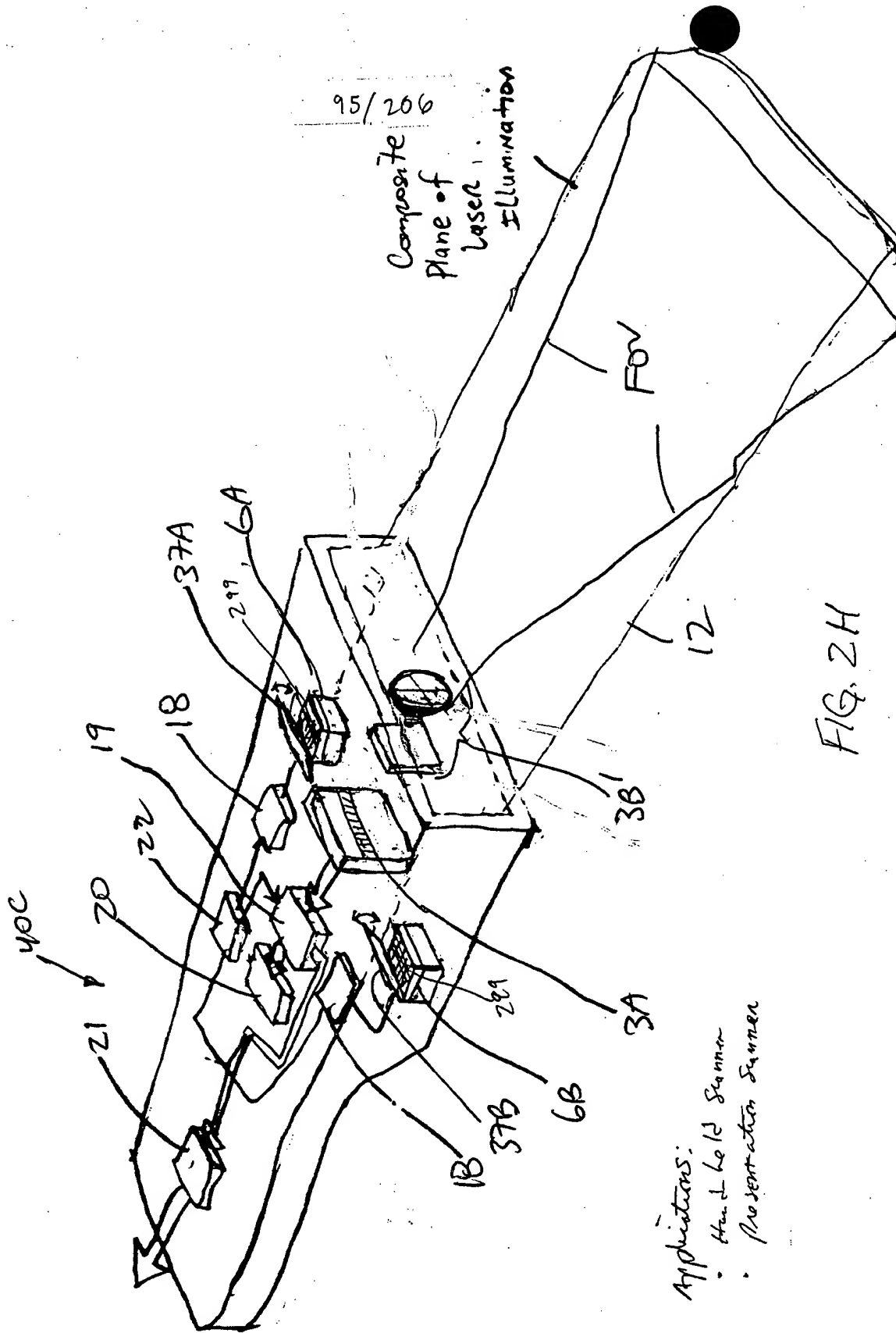


FIG. 2G



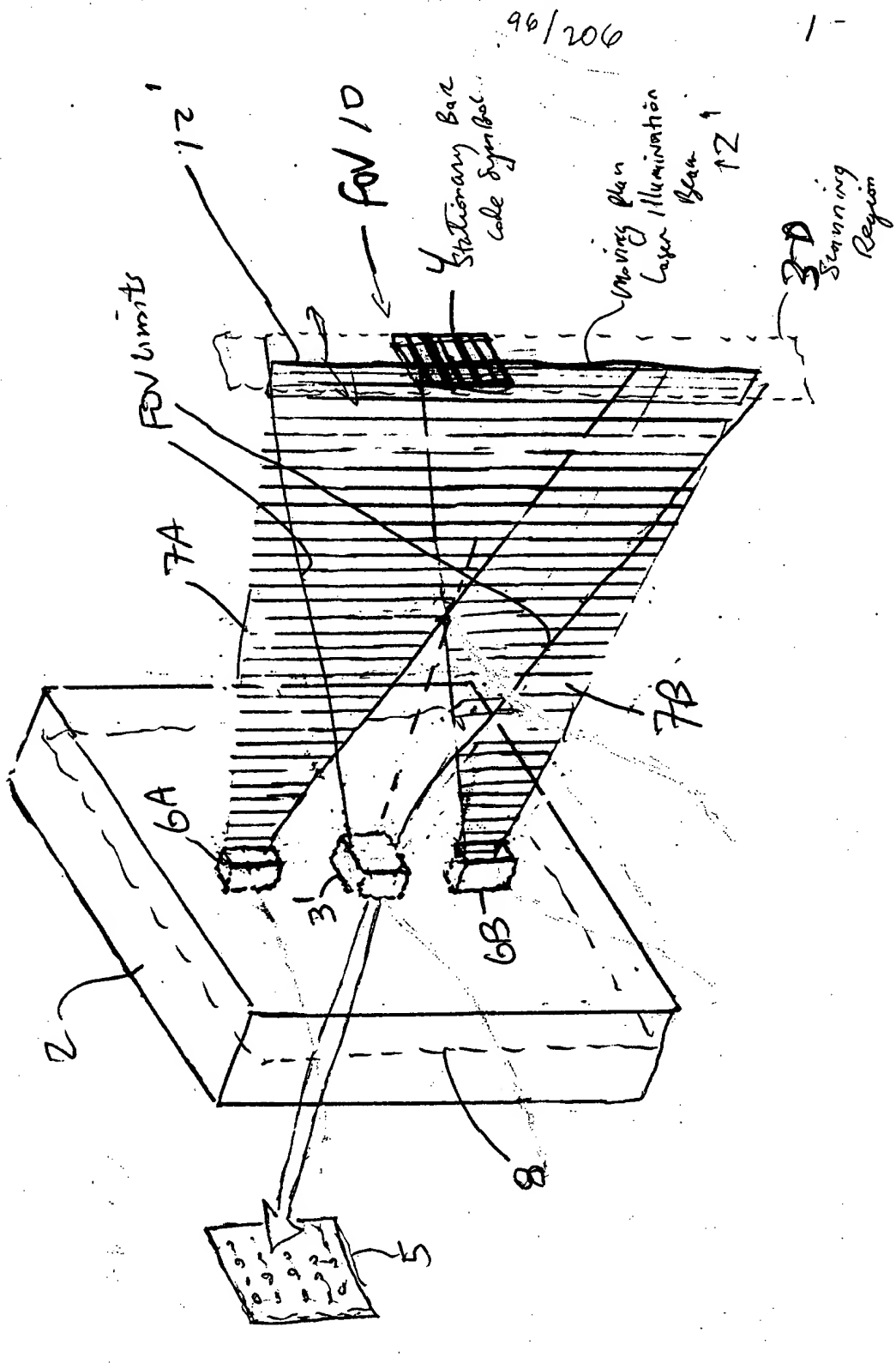
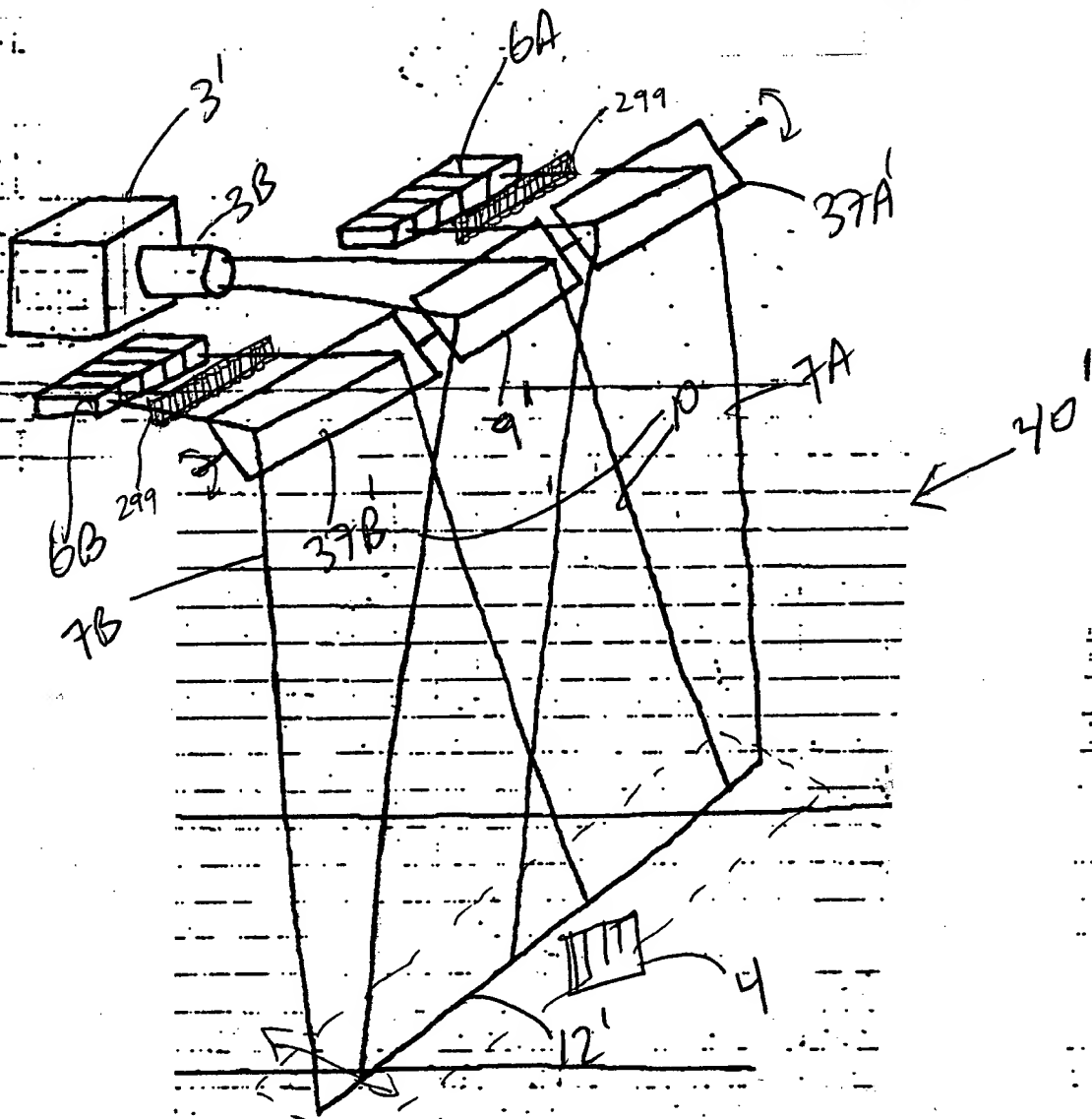


FIG. 2I1

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3-D  
Scanning  
Region

FIG 2I2

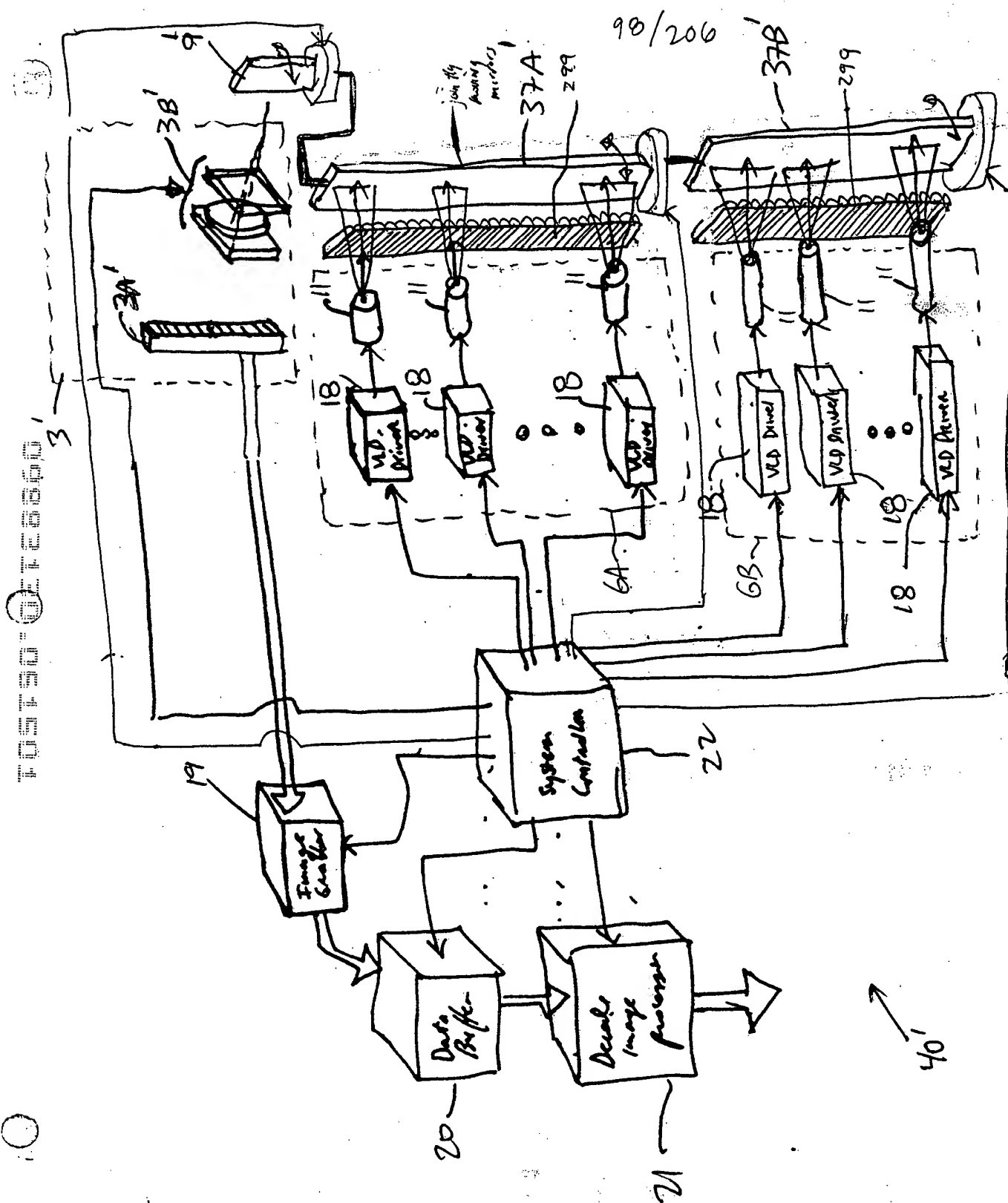


FIG. 2I3

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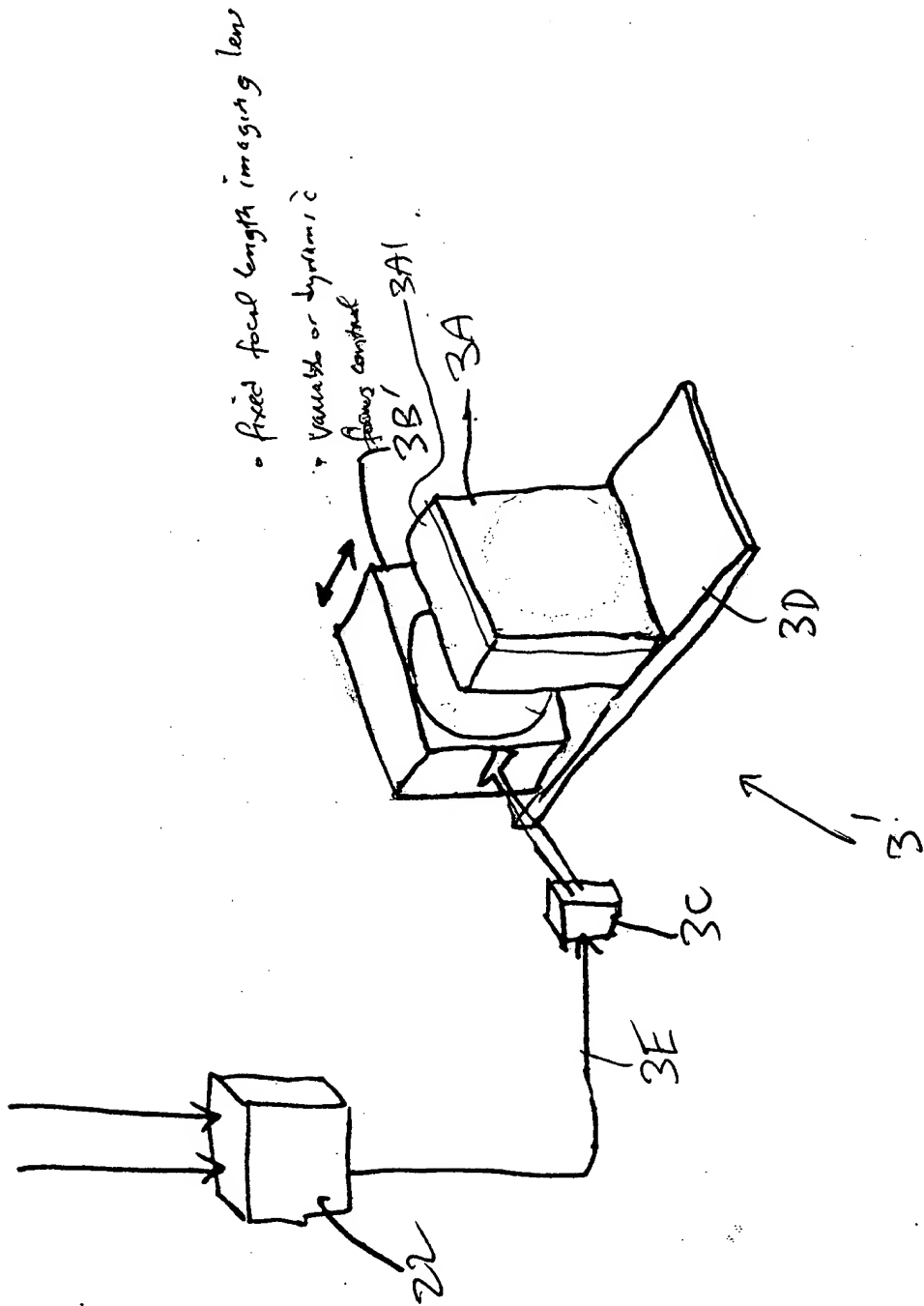


FIG. 2I4



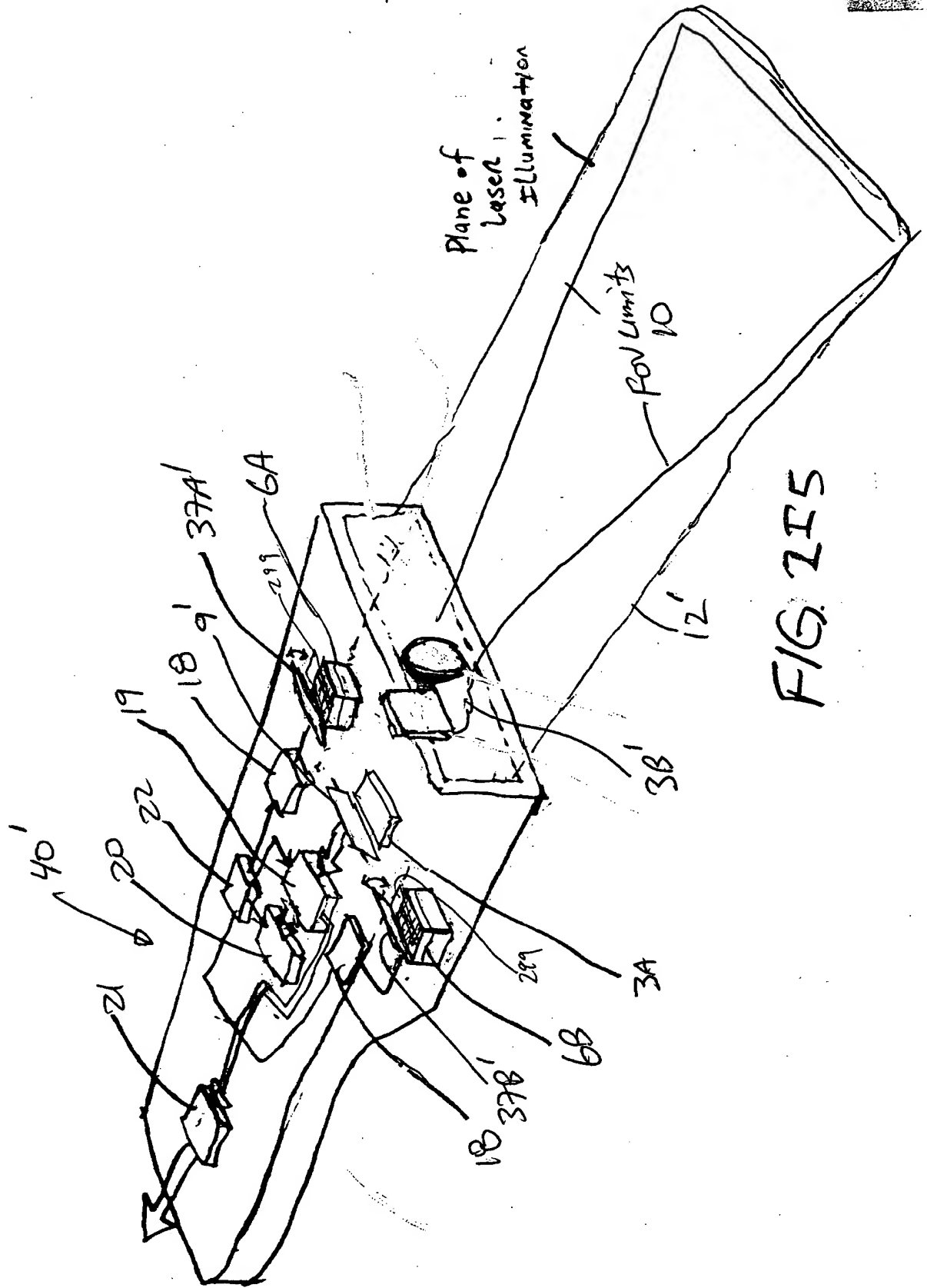


FIG. 215

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FIG. 216

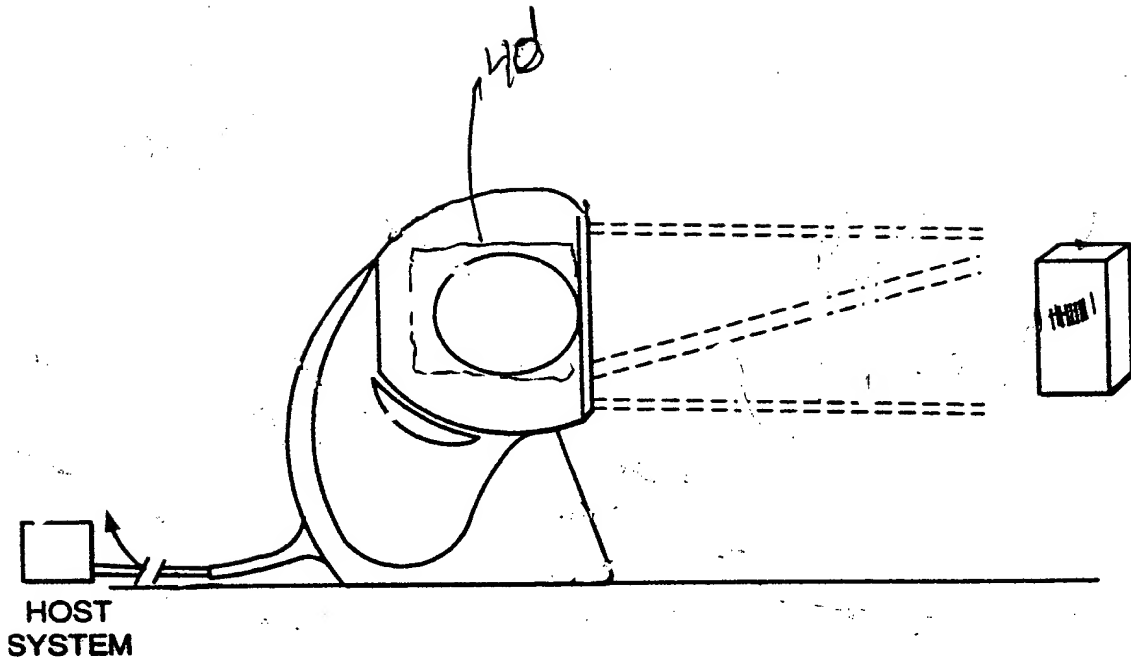


FIG. 216

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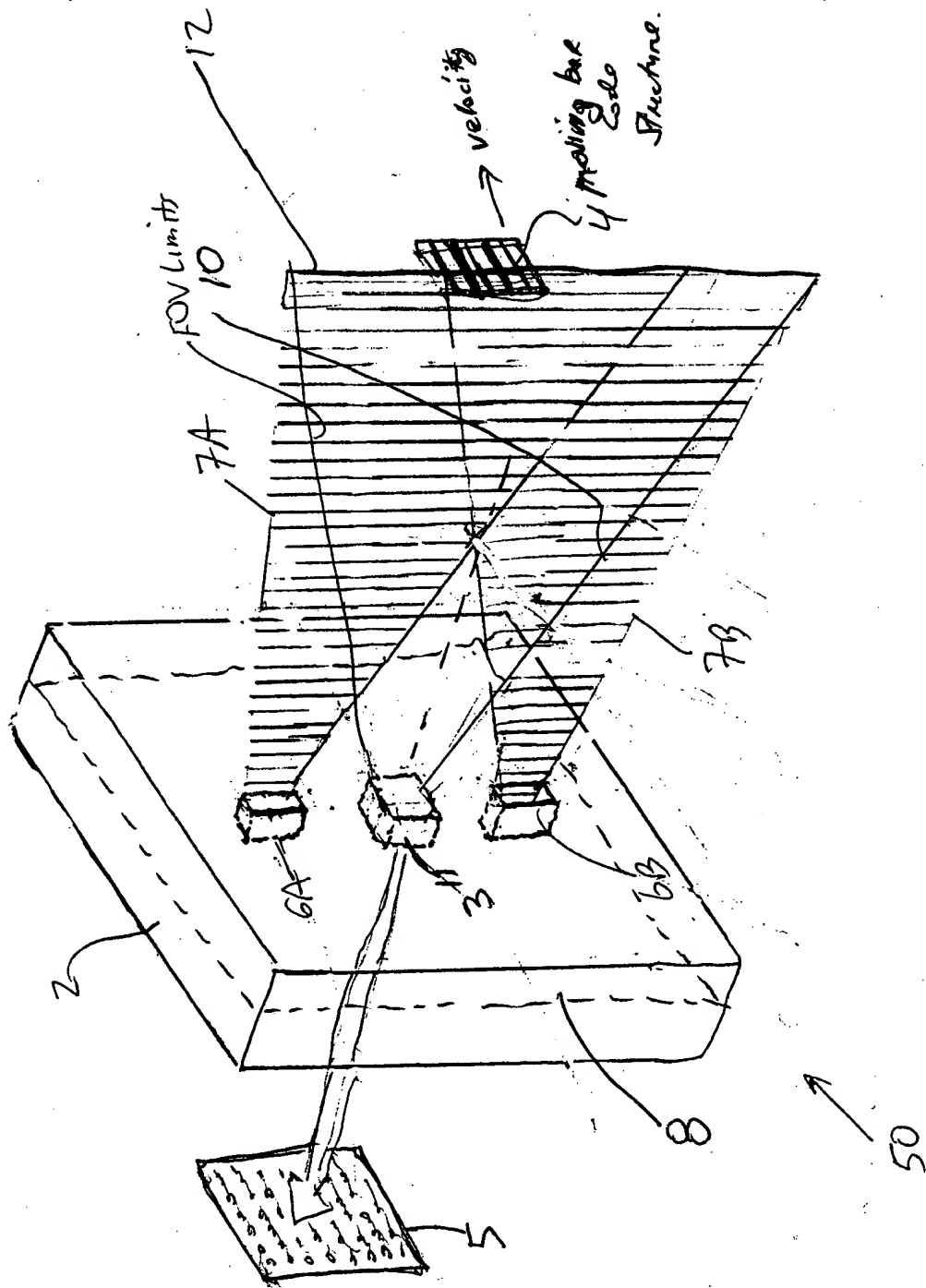


FIG 3A

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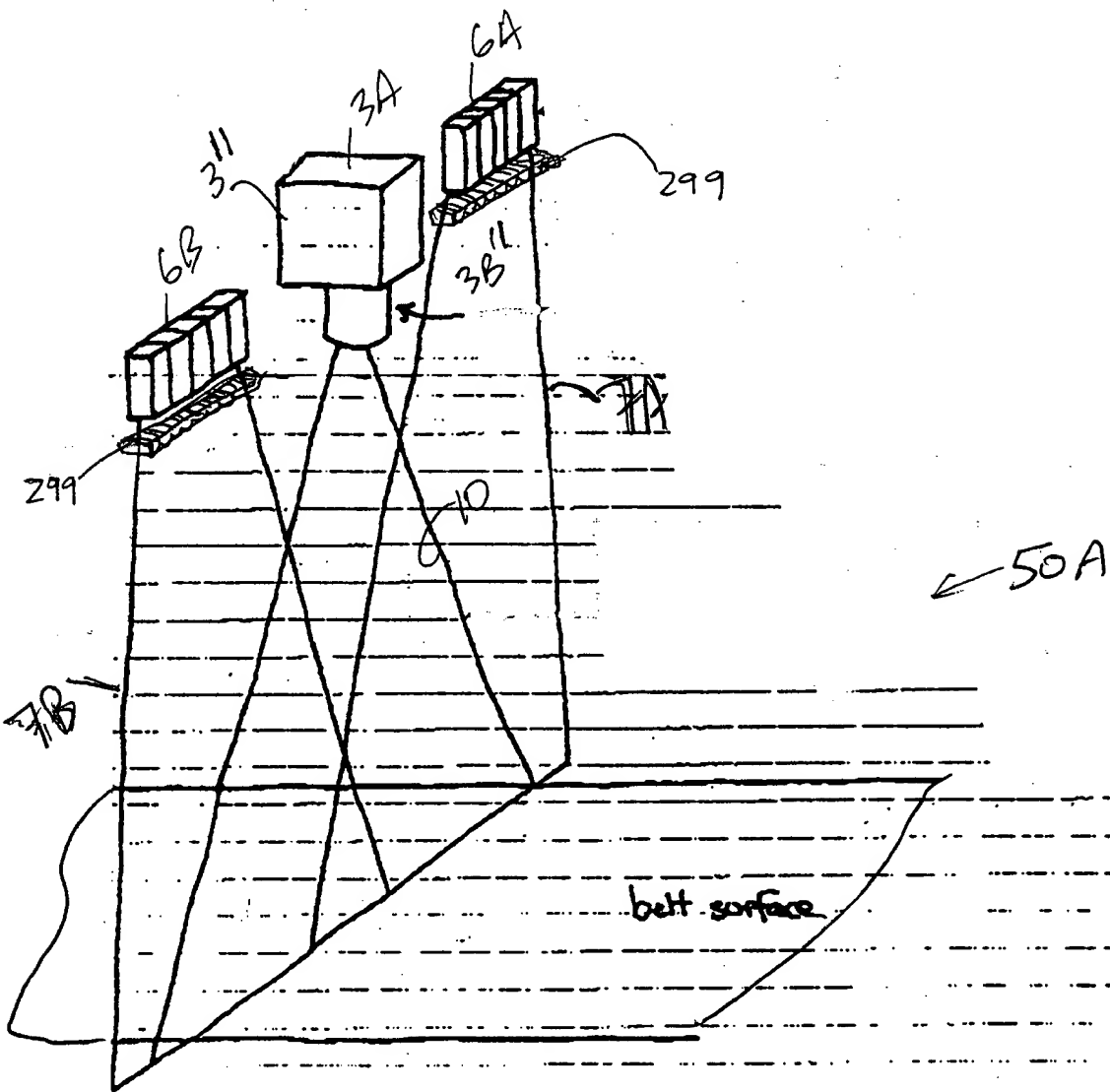


FIG. 3B1

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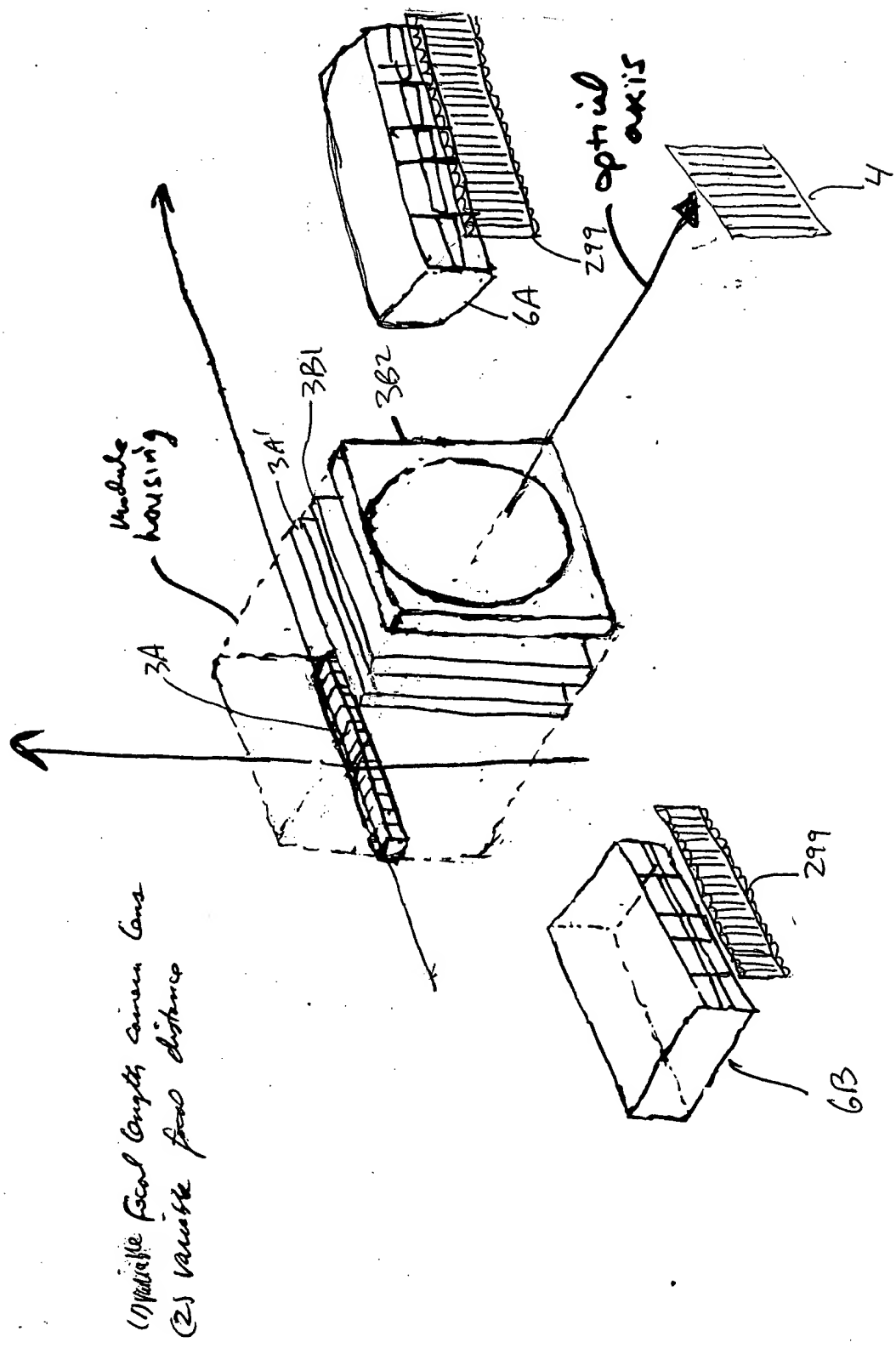
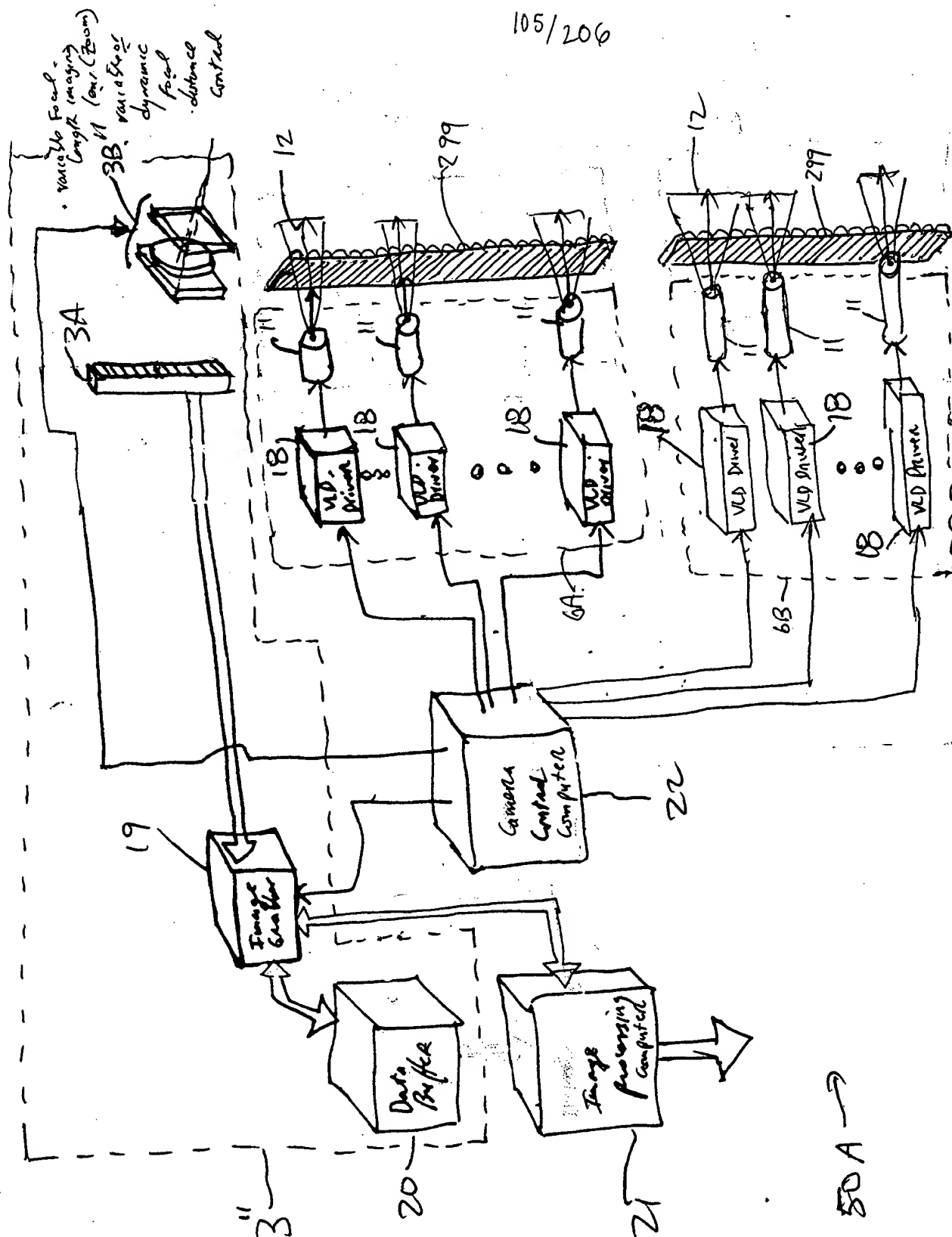


FIG. 3B2

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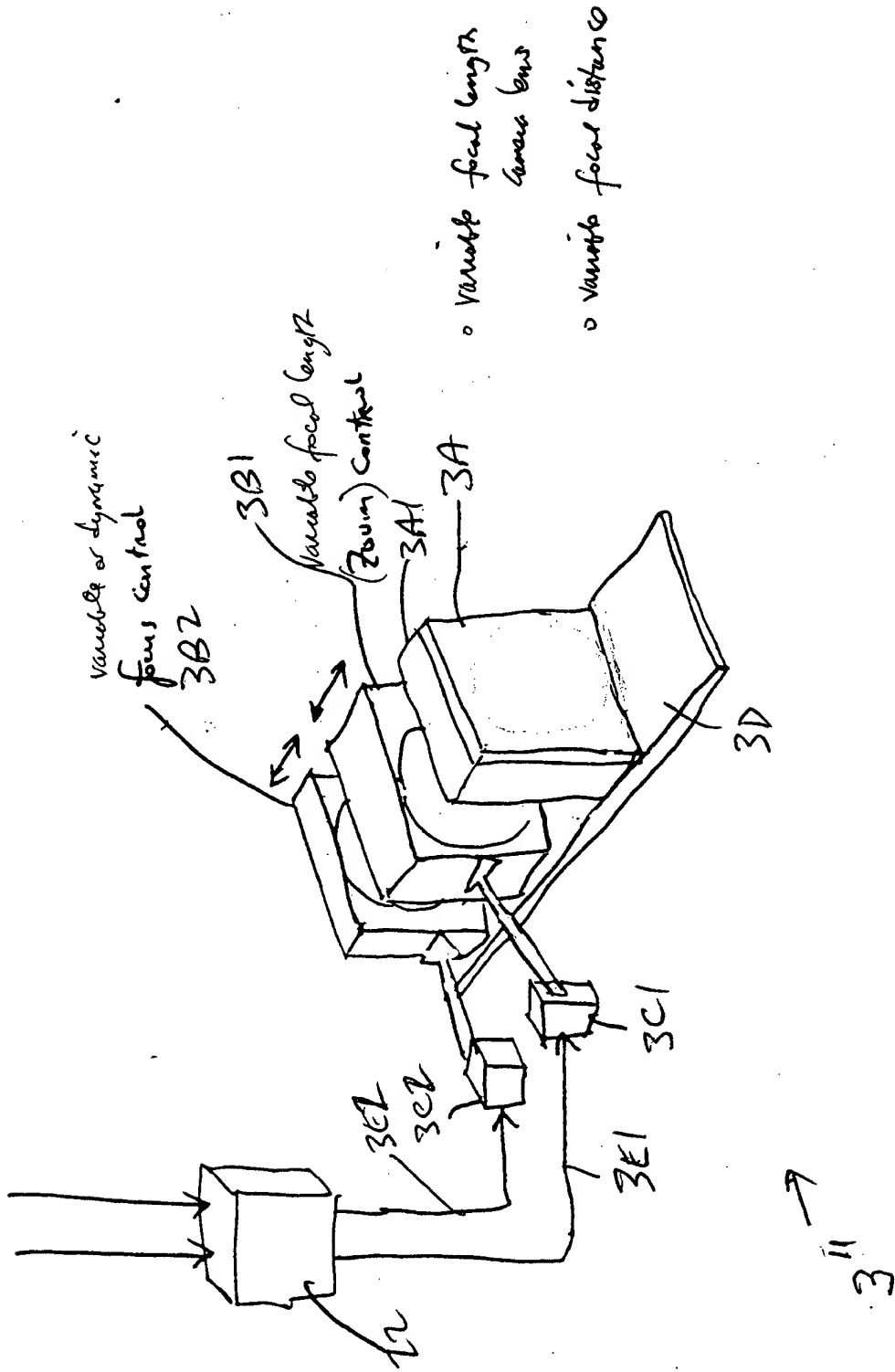


FIG. 3C2

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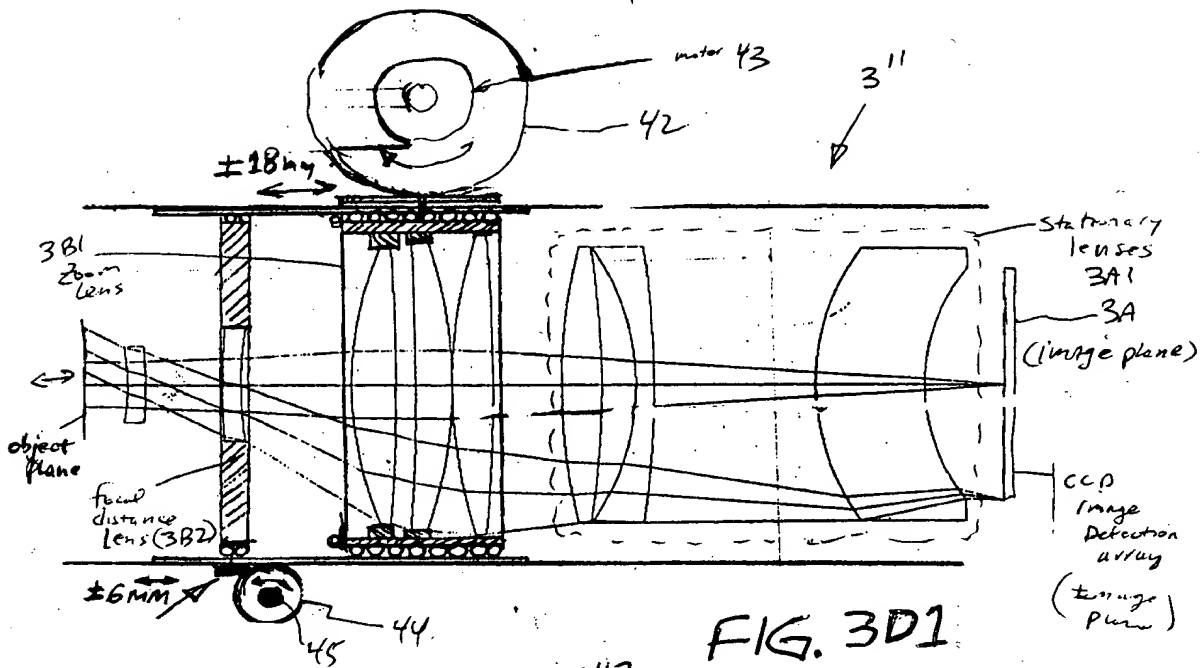


FIG. 3D1

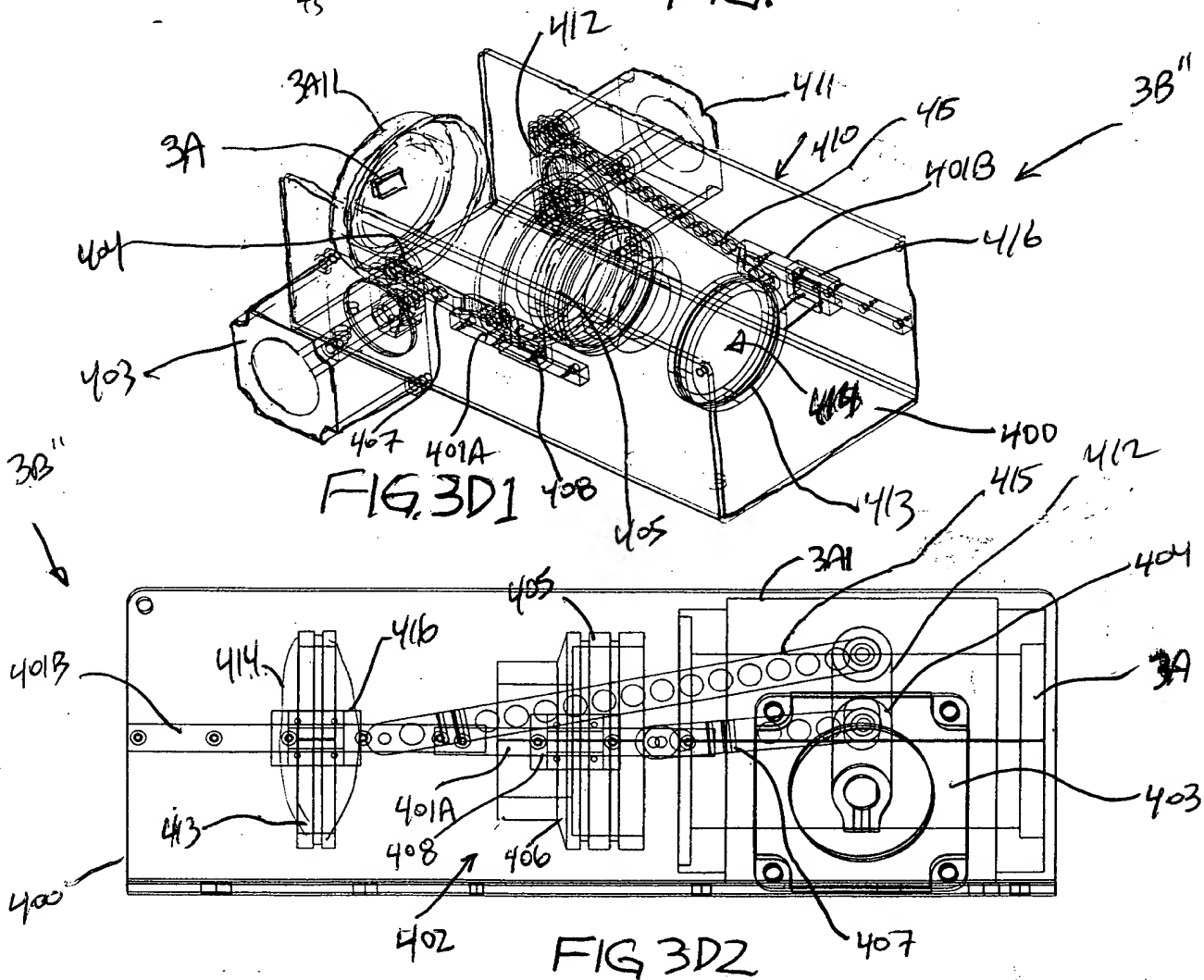


FIG 3D2



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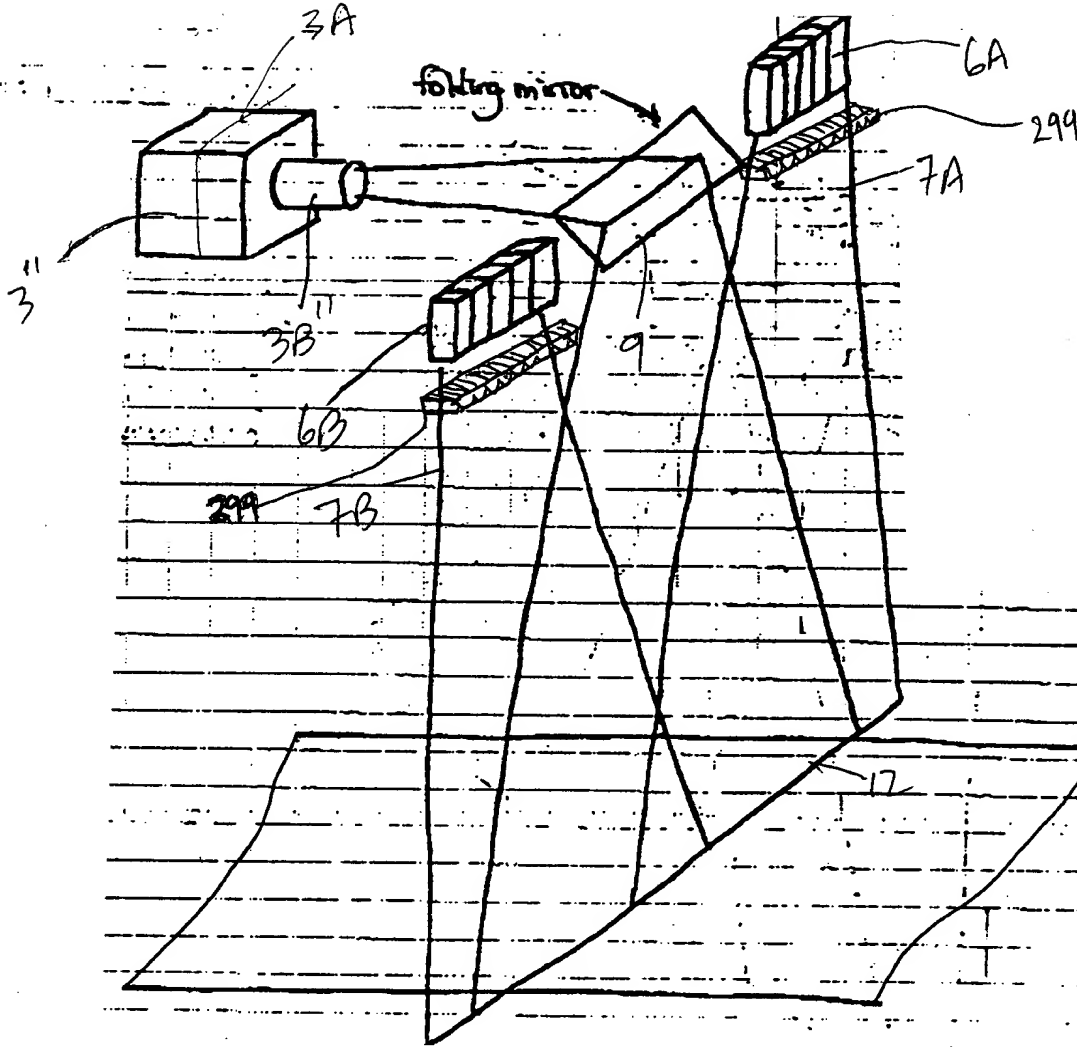


FIG. 3E1

FOOT DETECTOR

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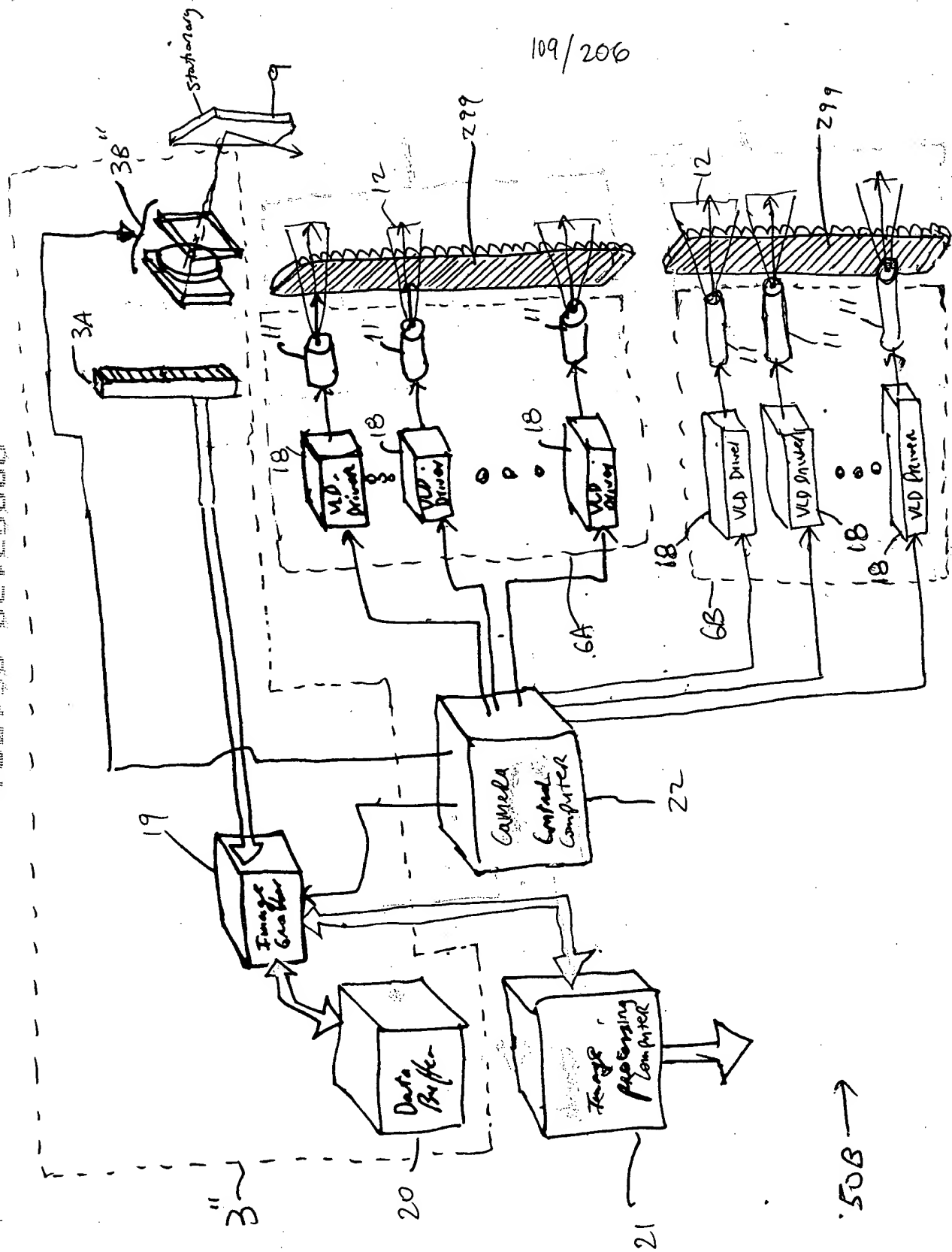


FIG. 3E2

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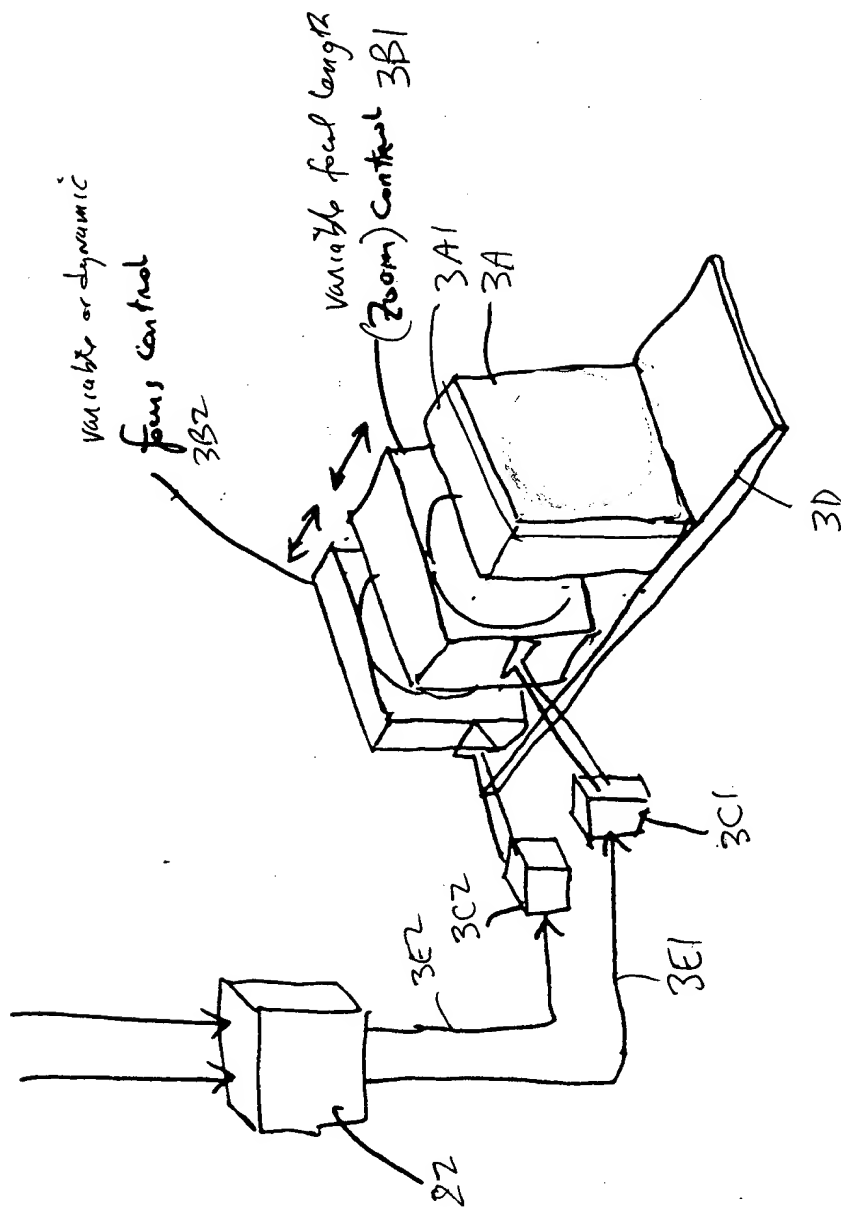
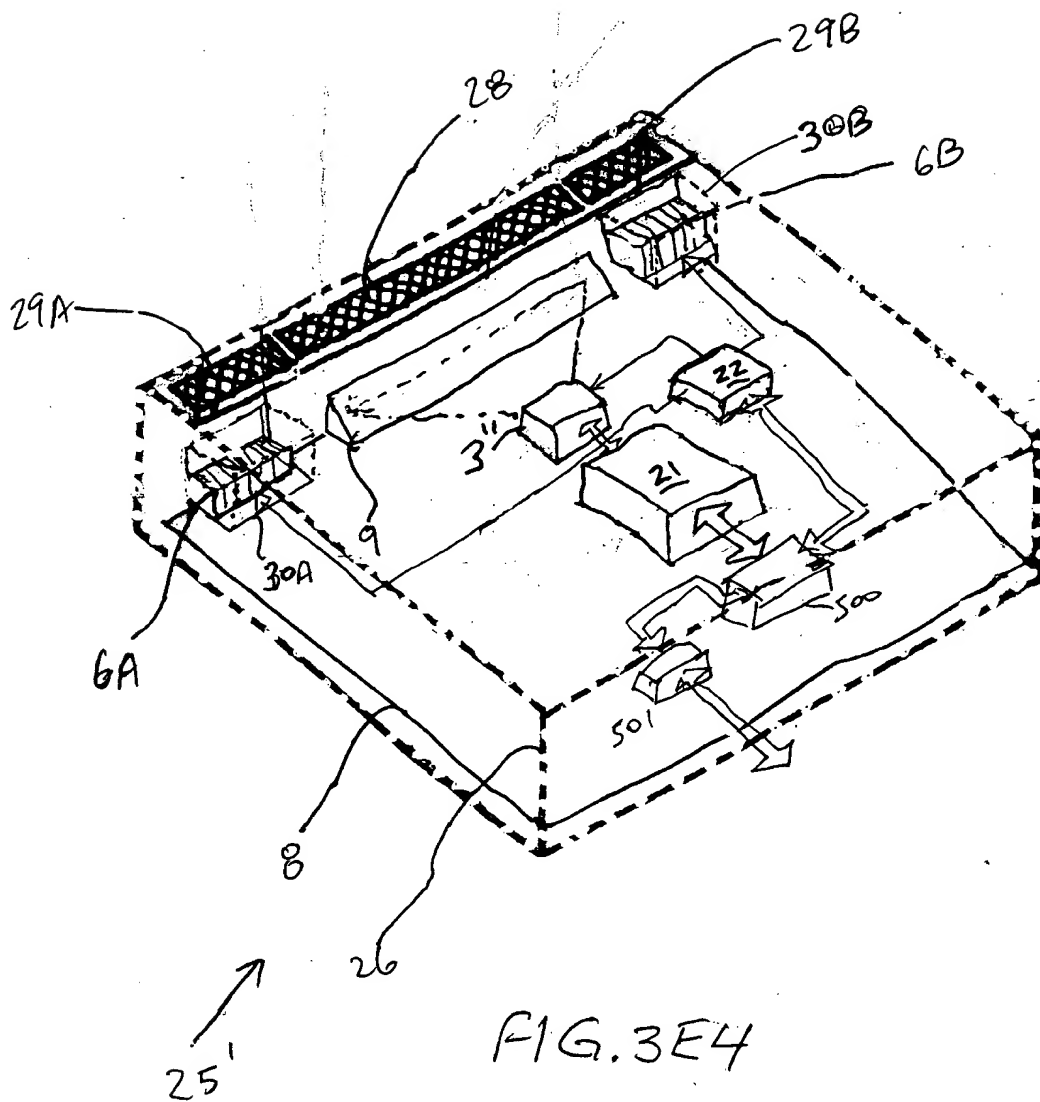


FIG. 3E3

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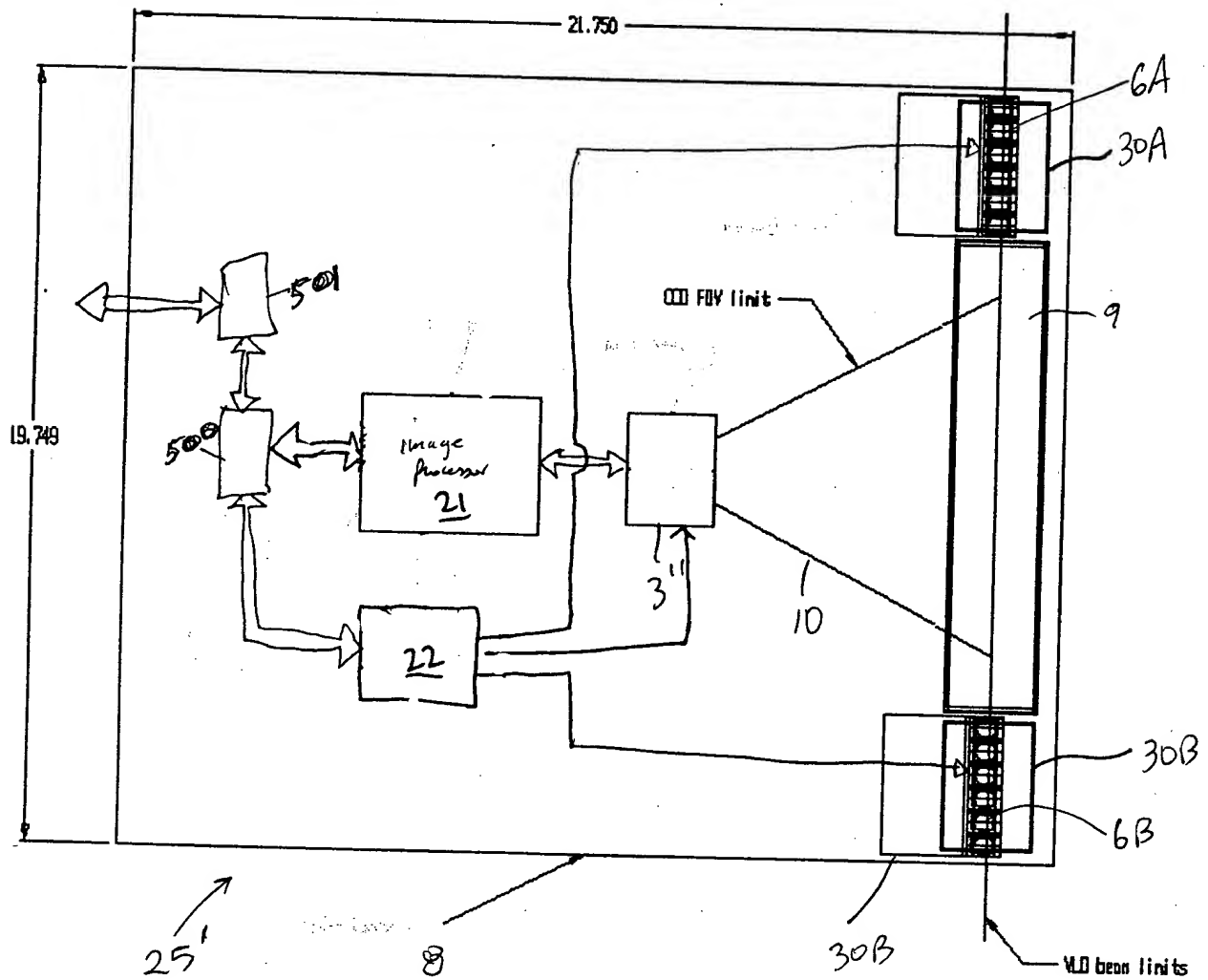
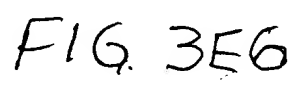


FIG. 3E5

[illegible]

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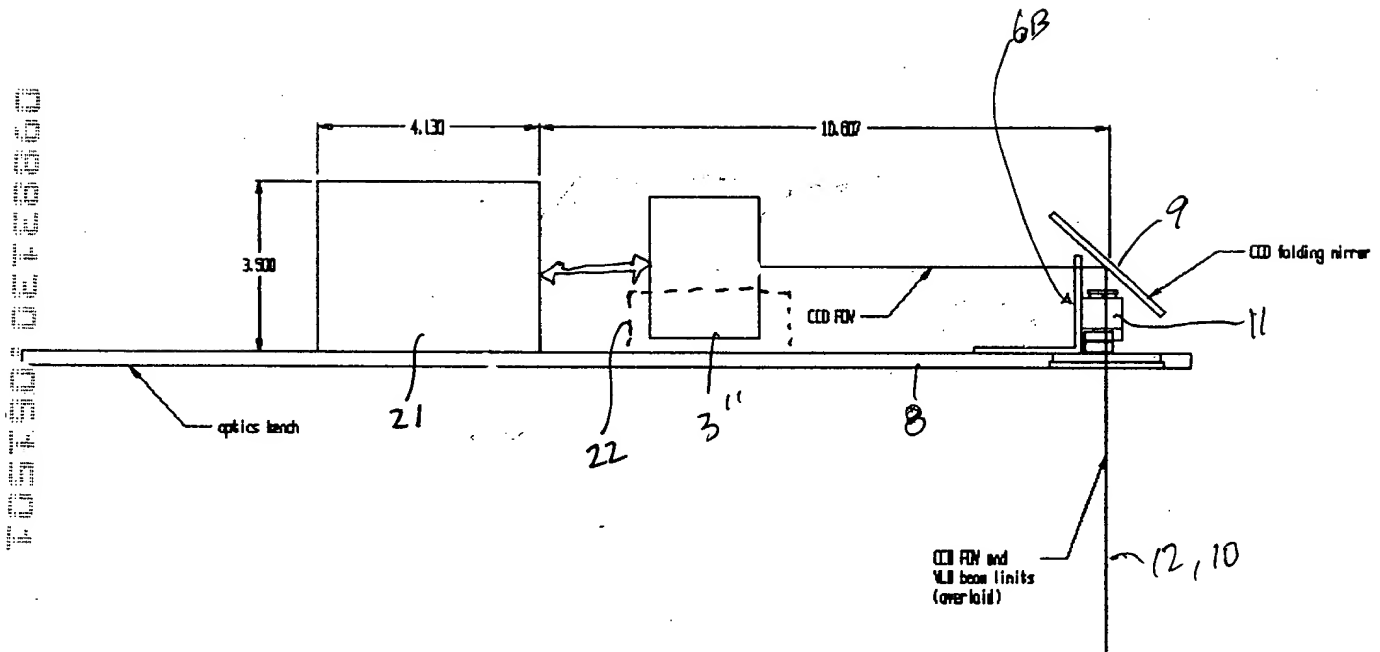


FIG. 3E7

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\*Variable FOV

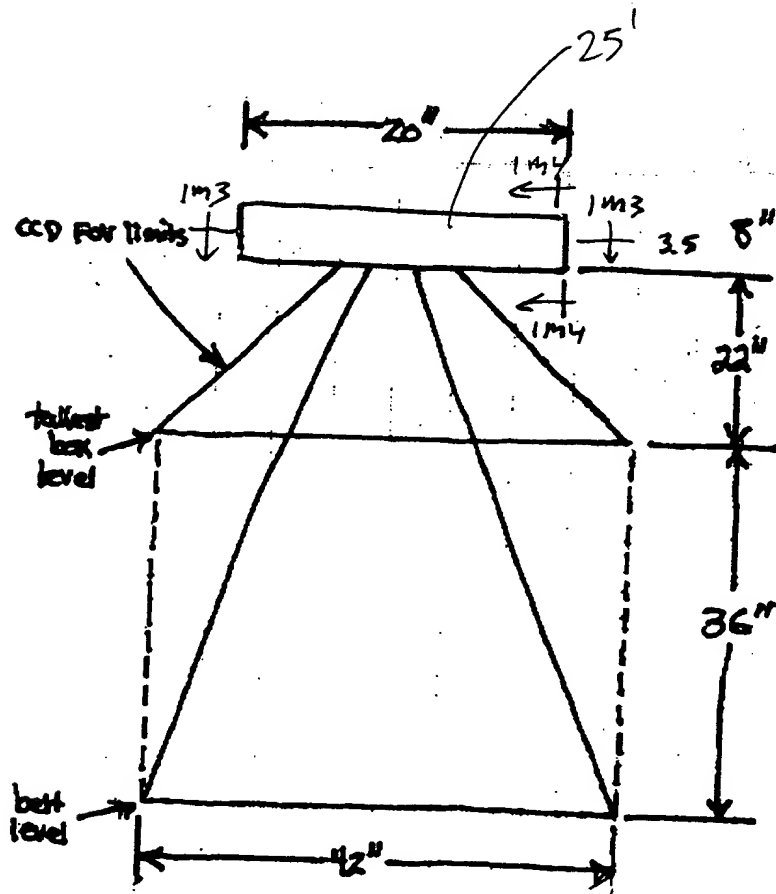


FIG. 3E8



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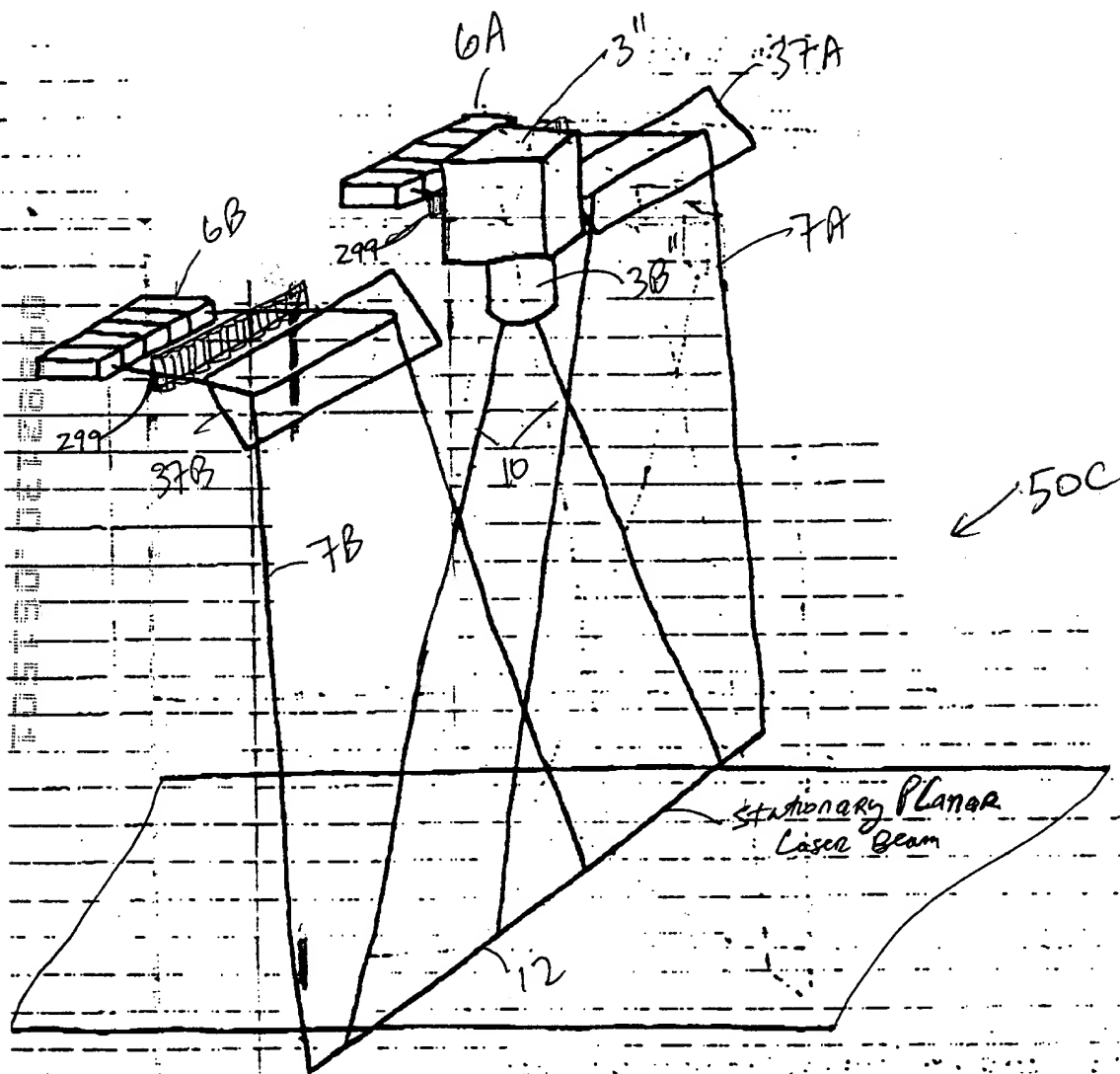


FIG. 3F1

FOOTNOTES

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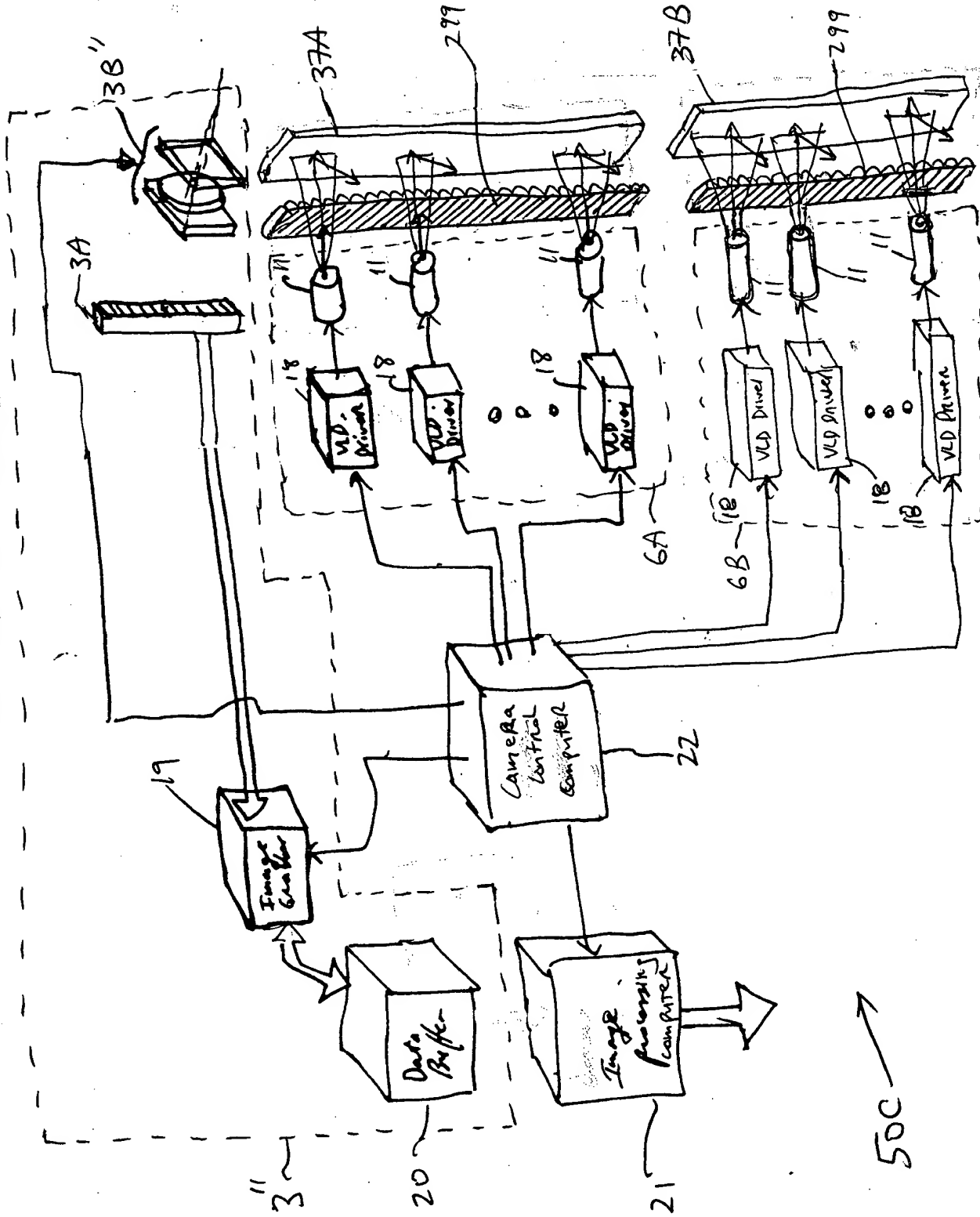


FIG. 3F2

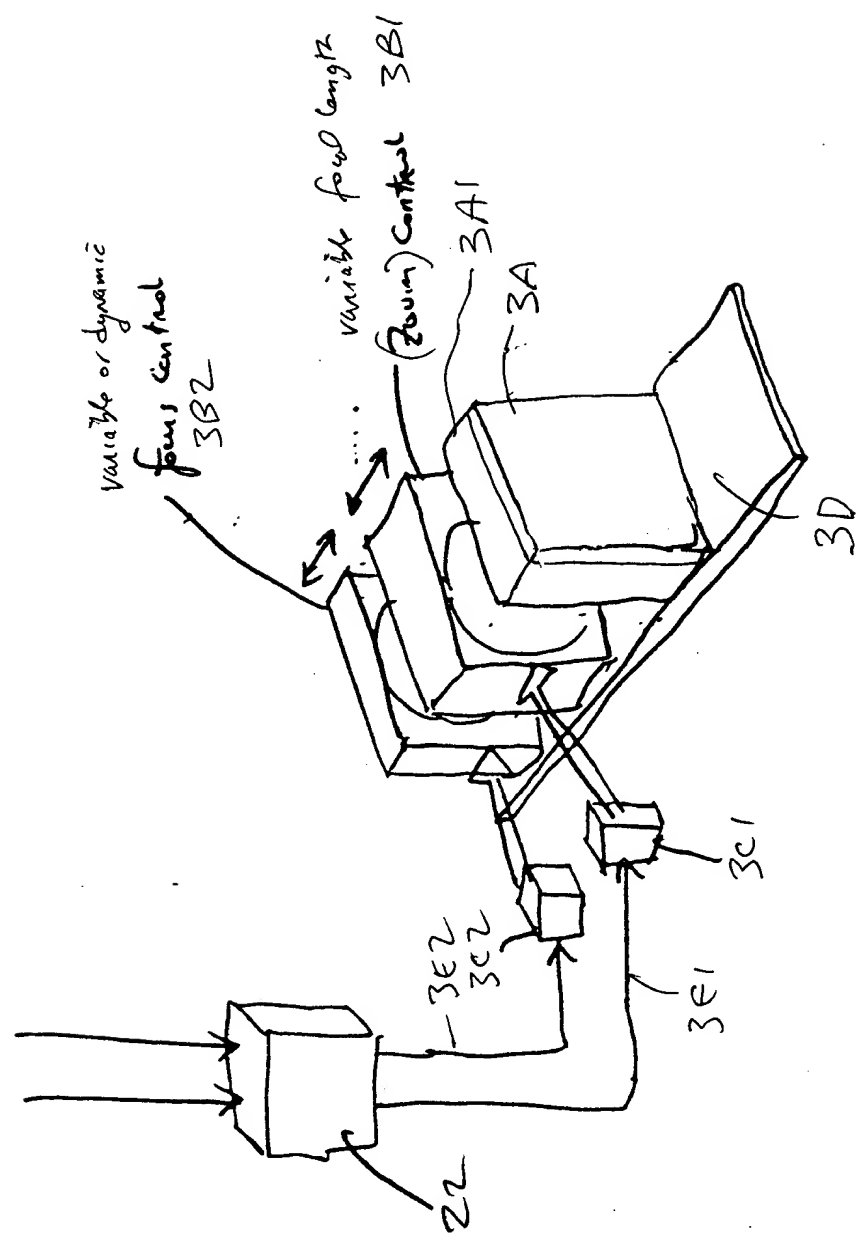


FIG. 3F3

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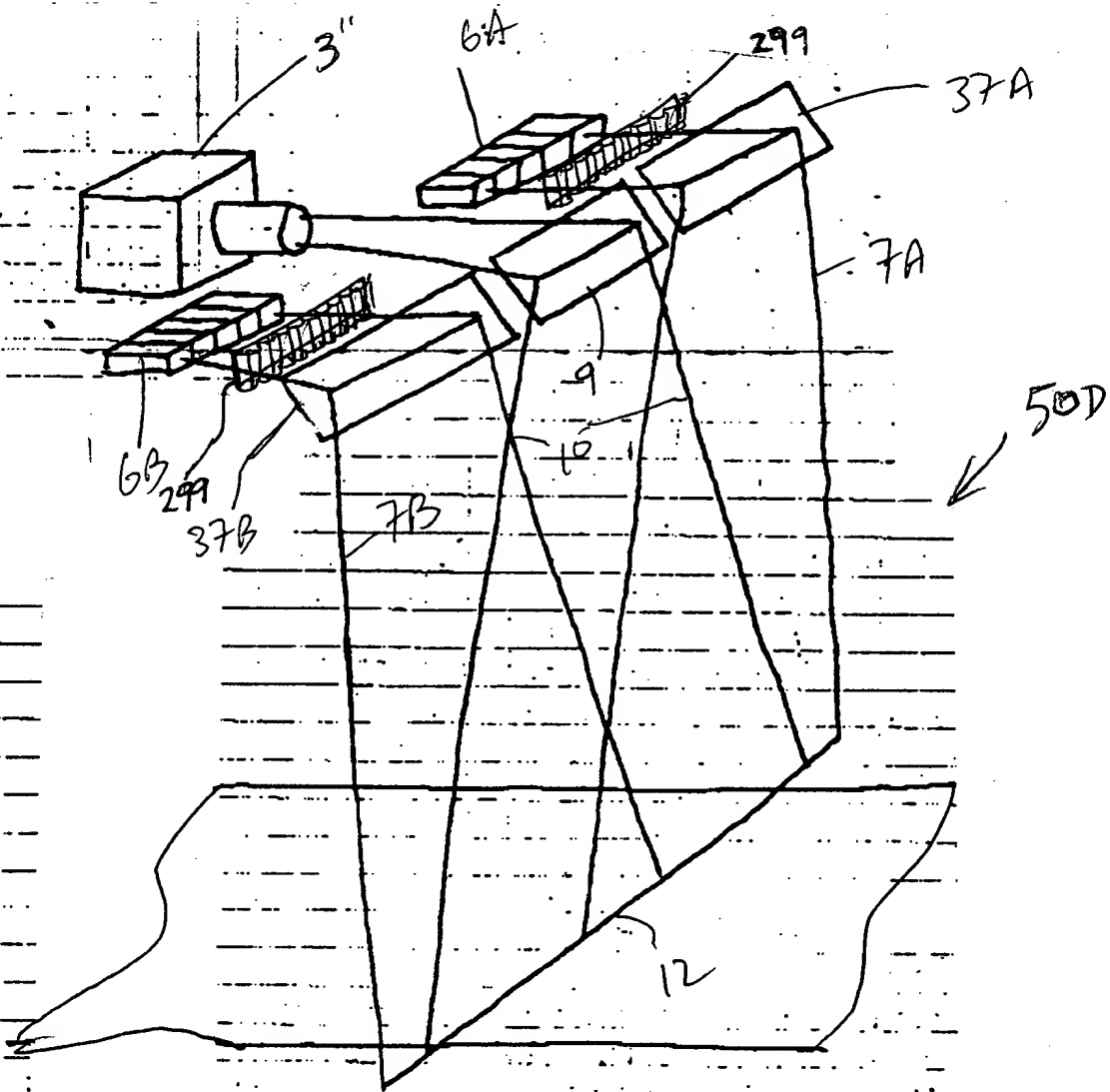


FIG 3G1

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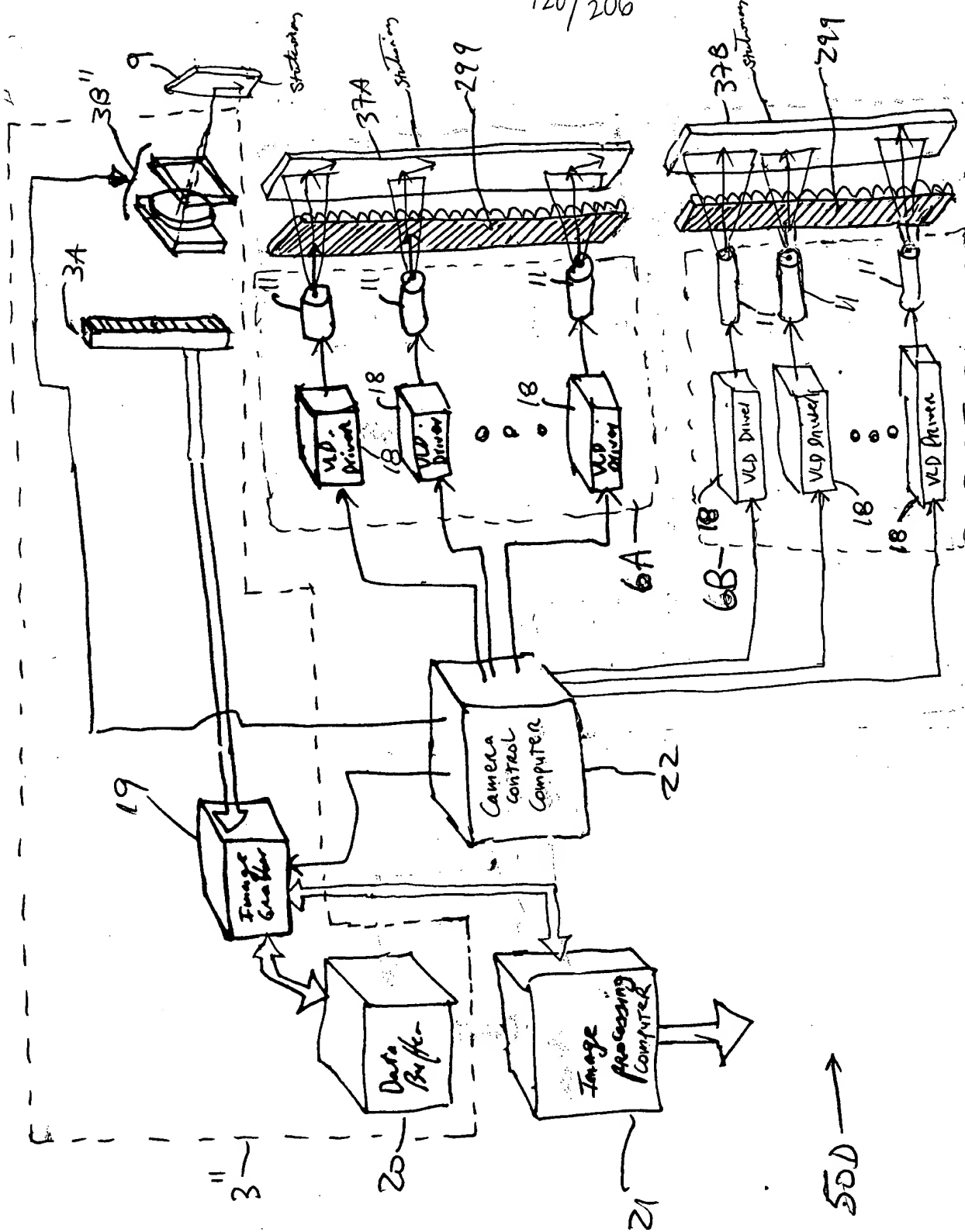


Fig. 362

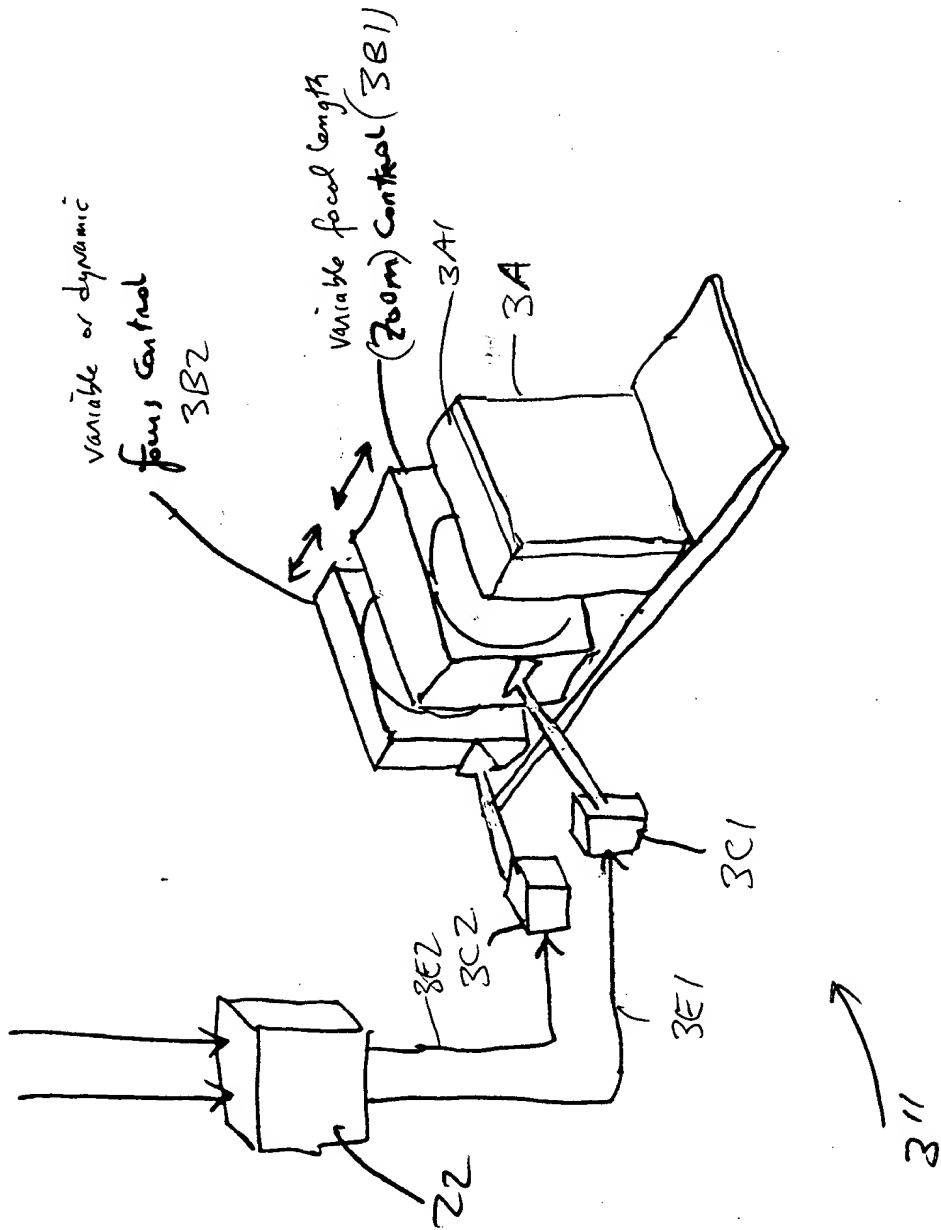


FIG. 3Q3

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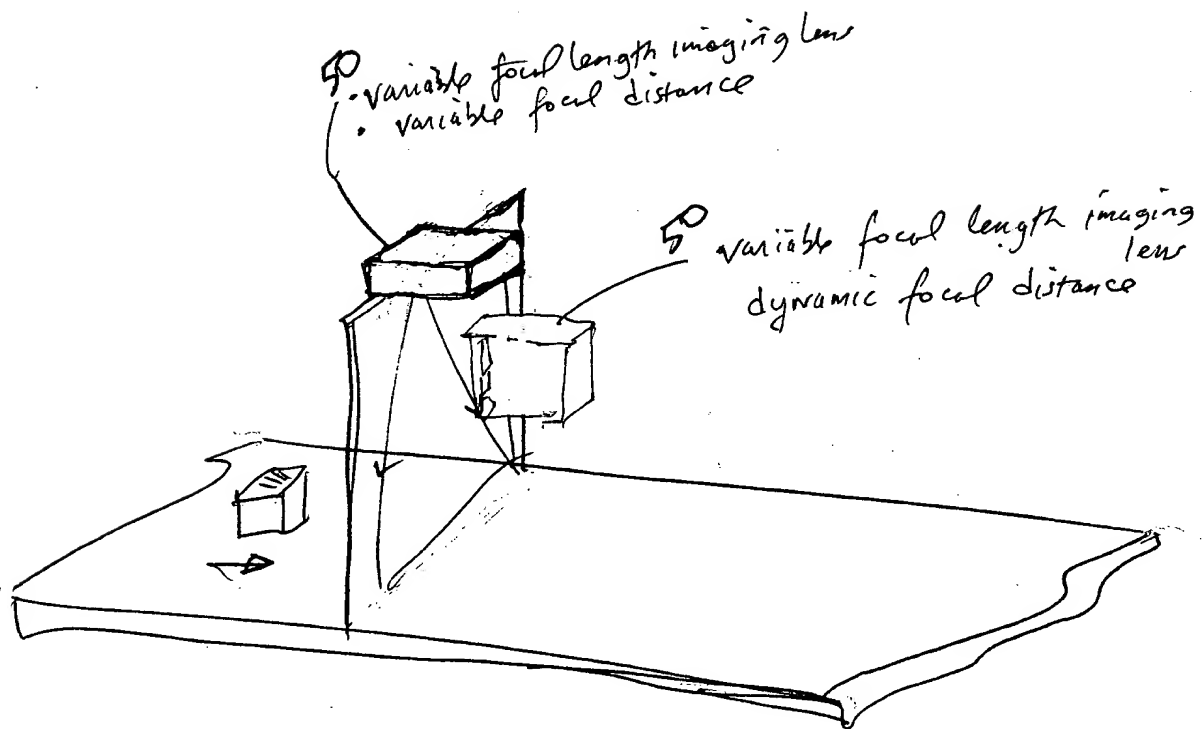


FIG. 3H

50D

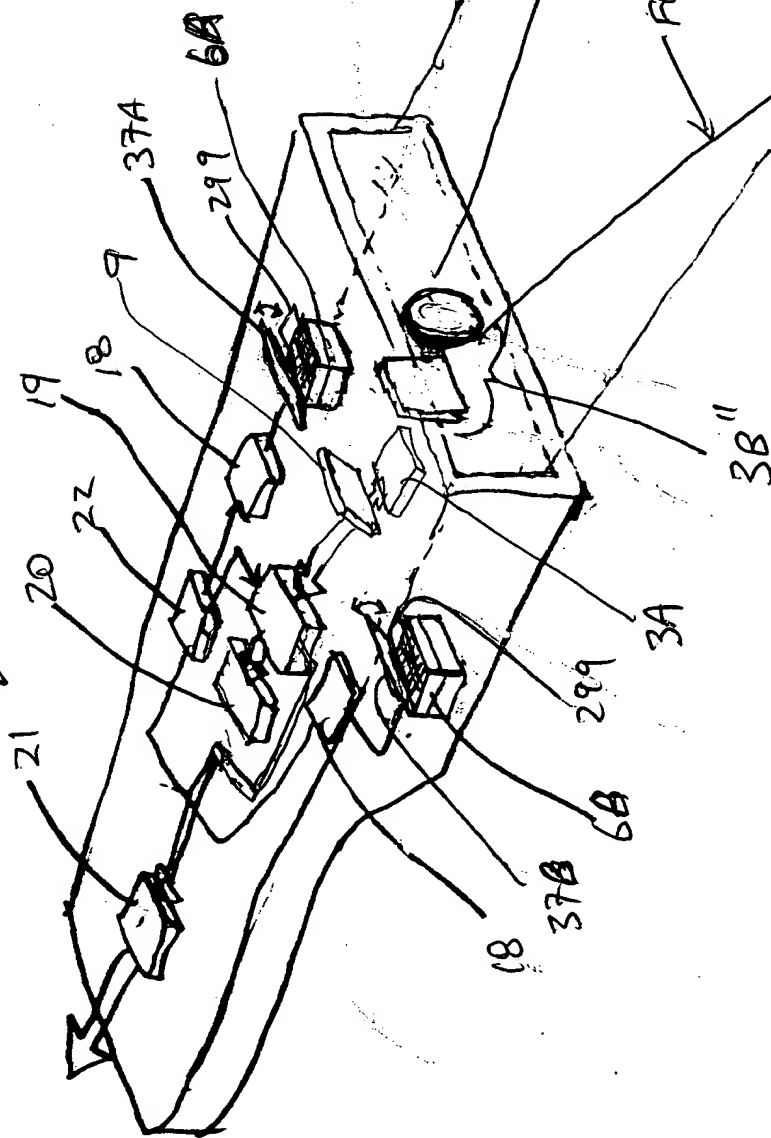
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Composite  
Plane of  
Laser  
Illumination

12

FOV Limits  
(10)

FIG. 3I





00001300500

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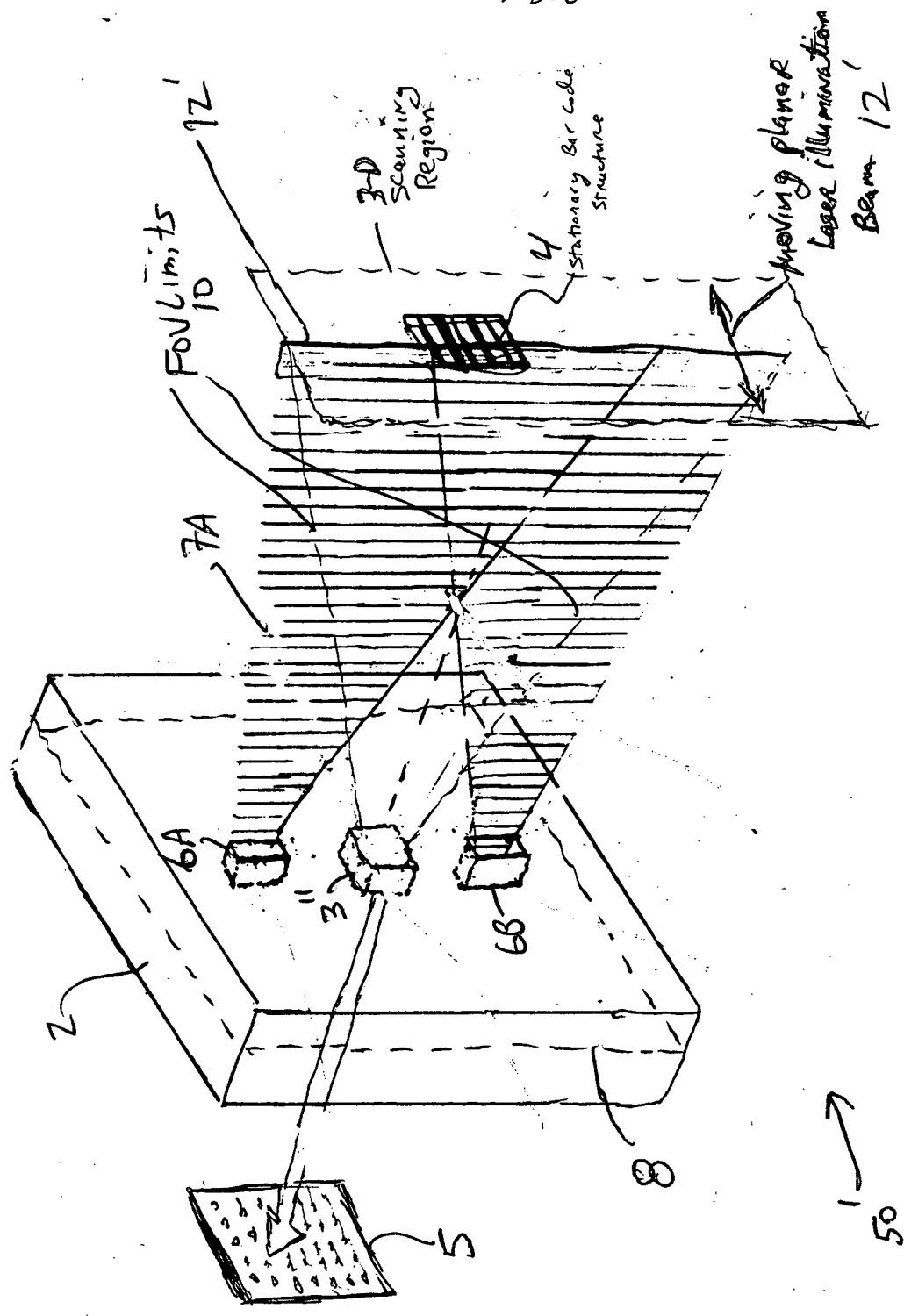


FIG. 3J1

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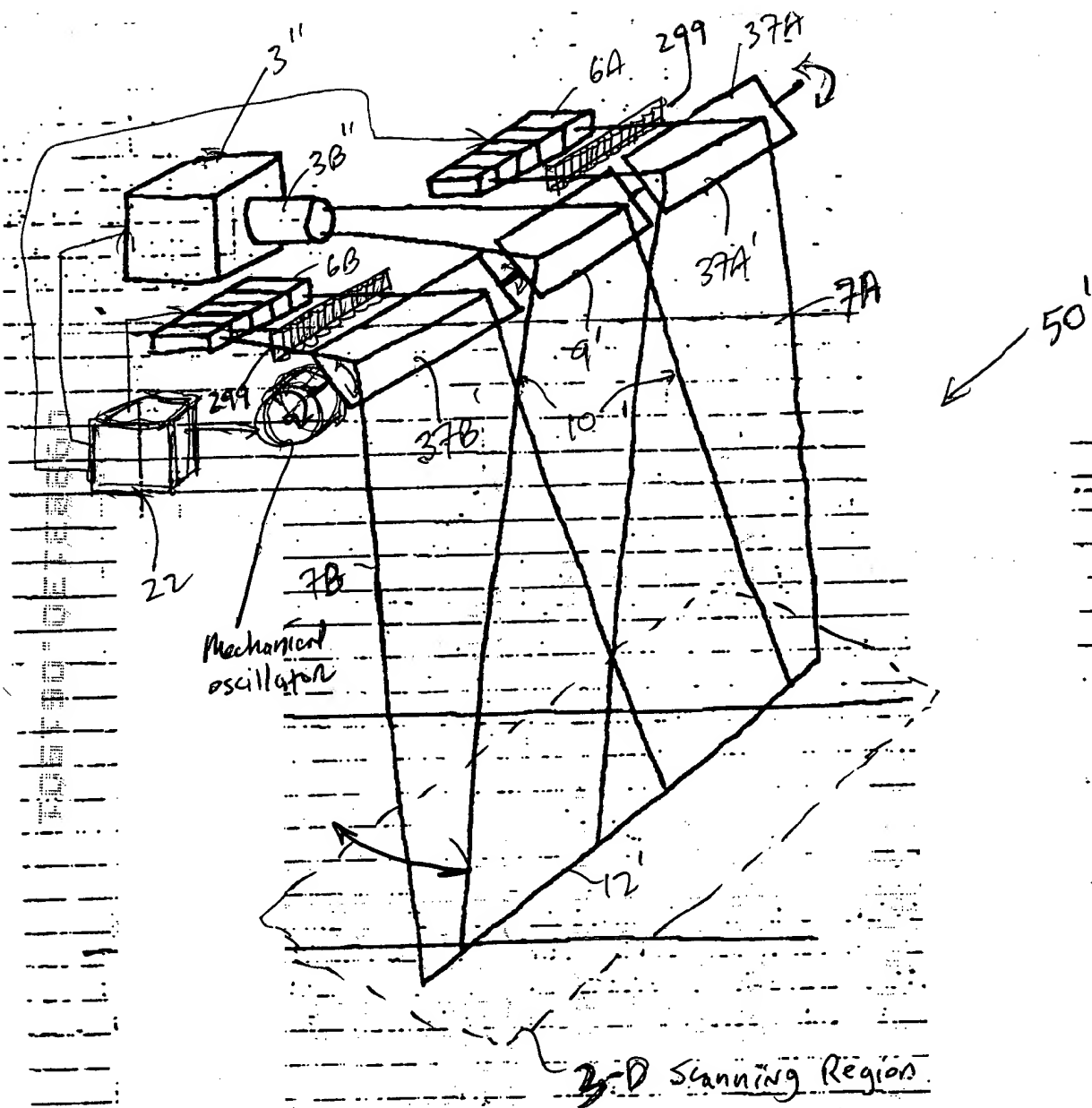


FIG 3J2

FIG. 30 DETECTION

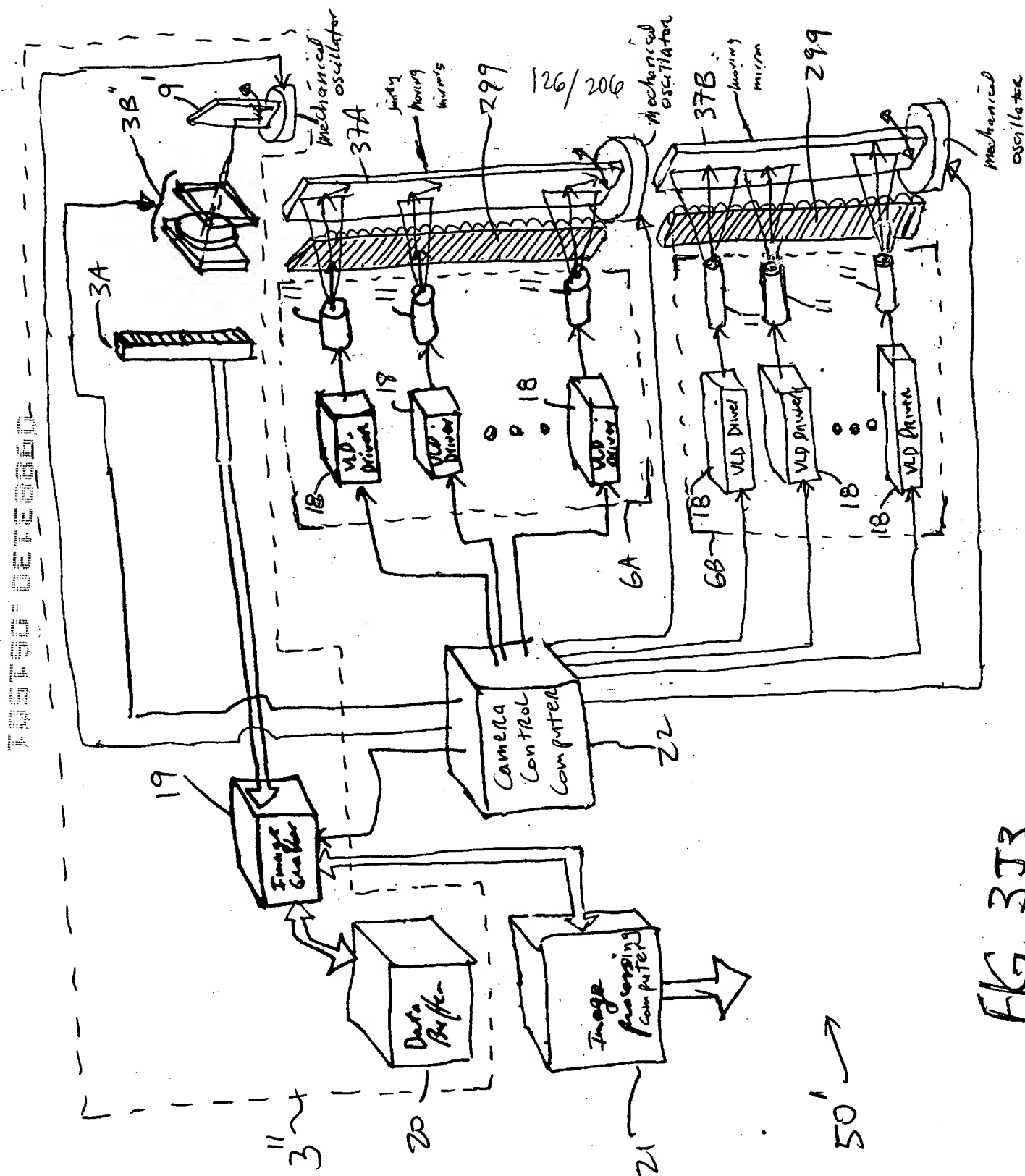


FIG. 31

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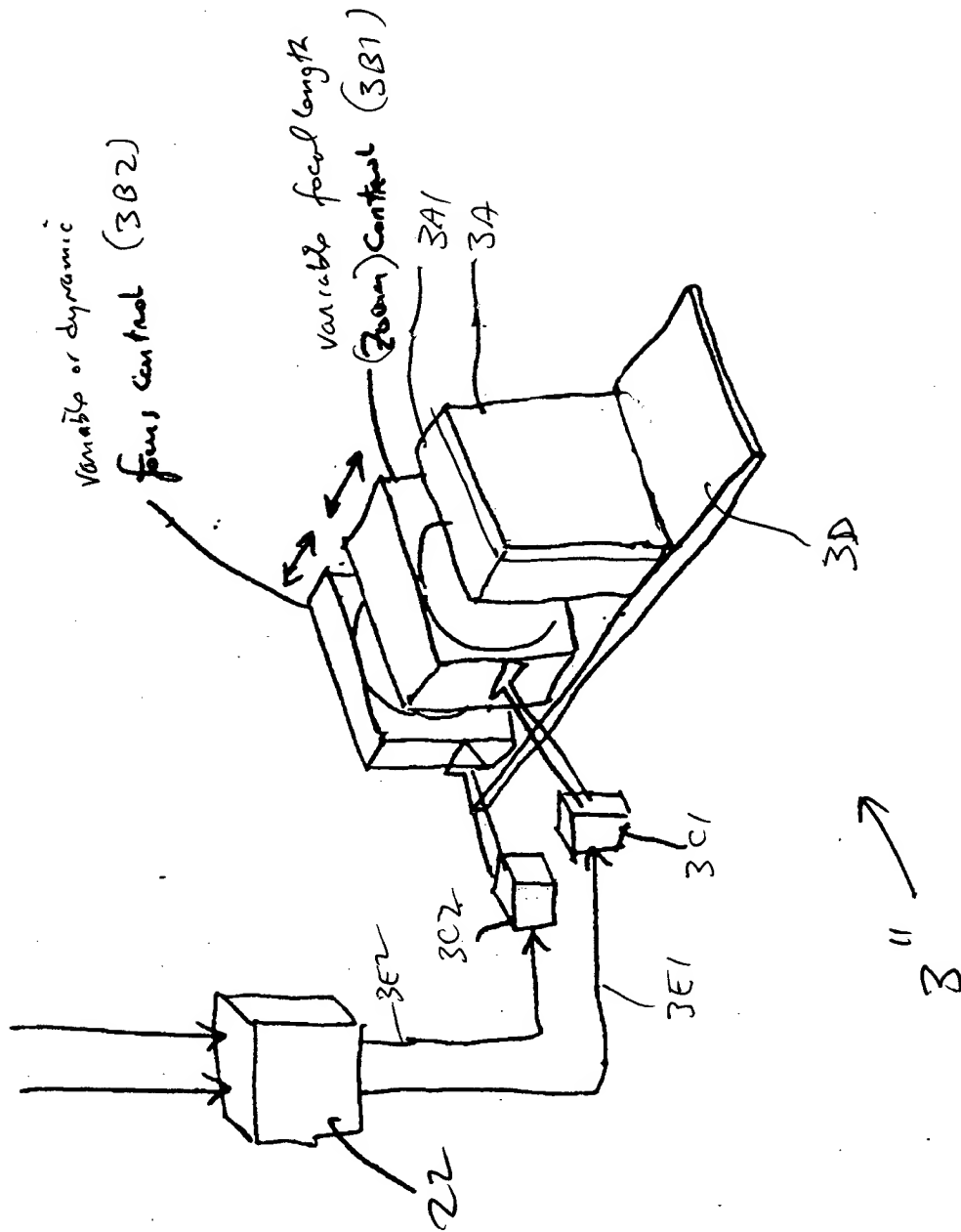


FIG. 354

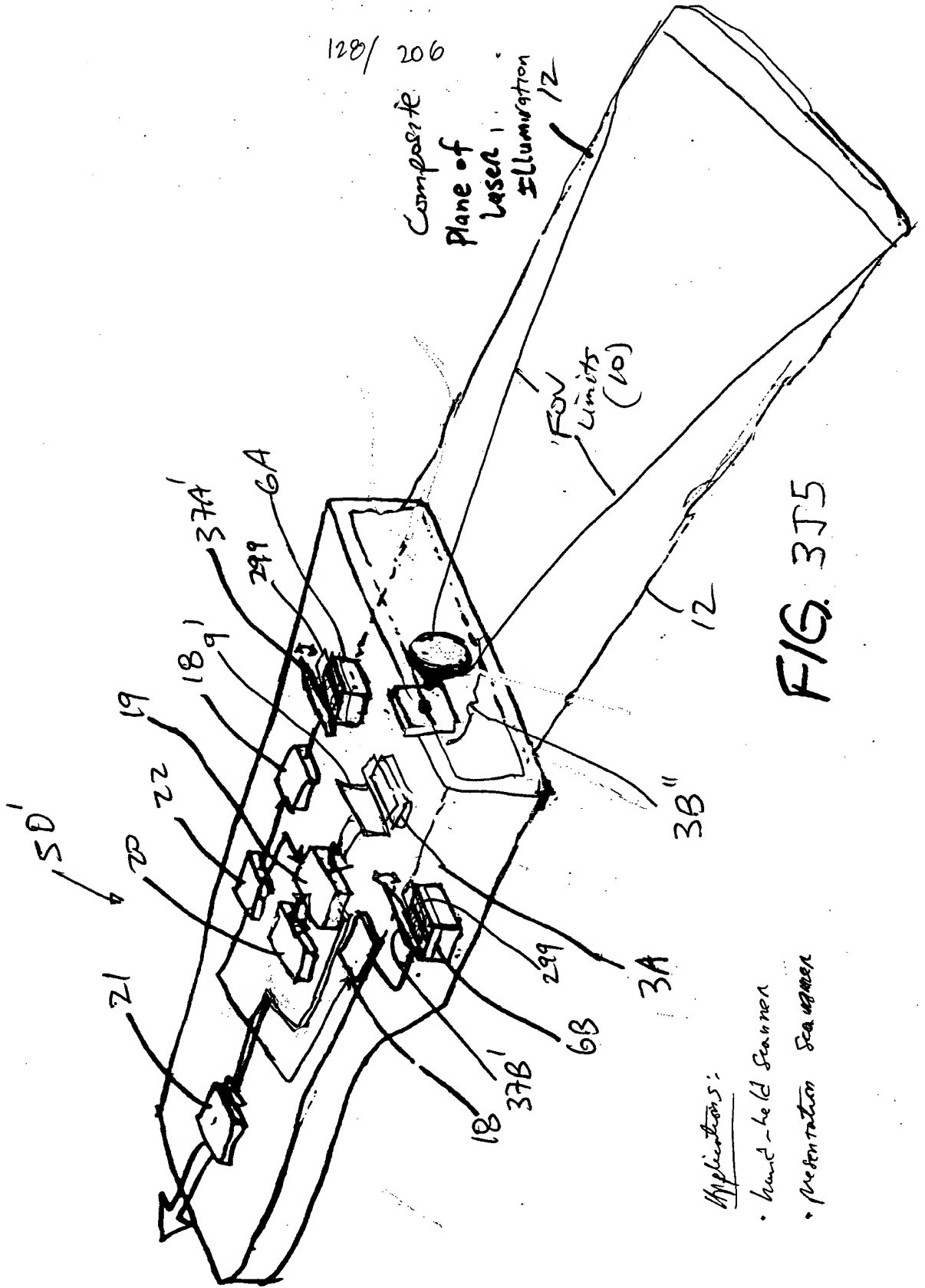
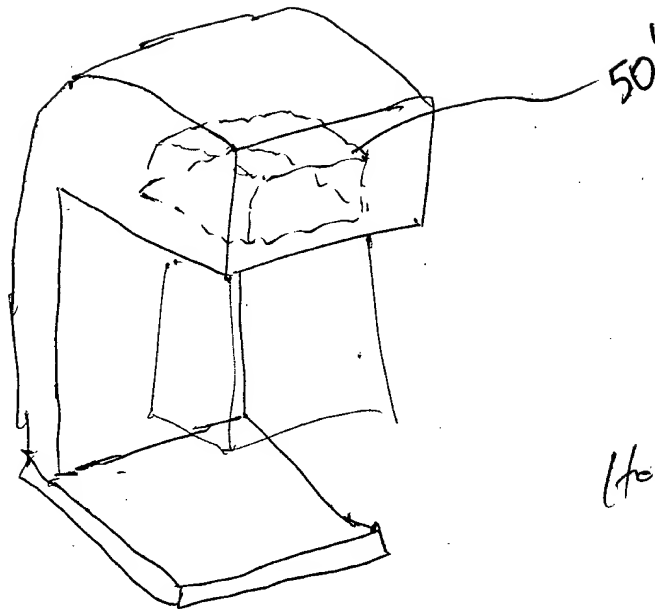


FIG. 3J5

Applications:

- hand-held scanner
- presentation scanner

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2-D  
hold-under  
scanner

FIG-316



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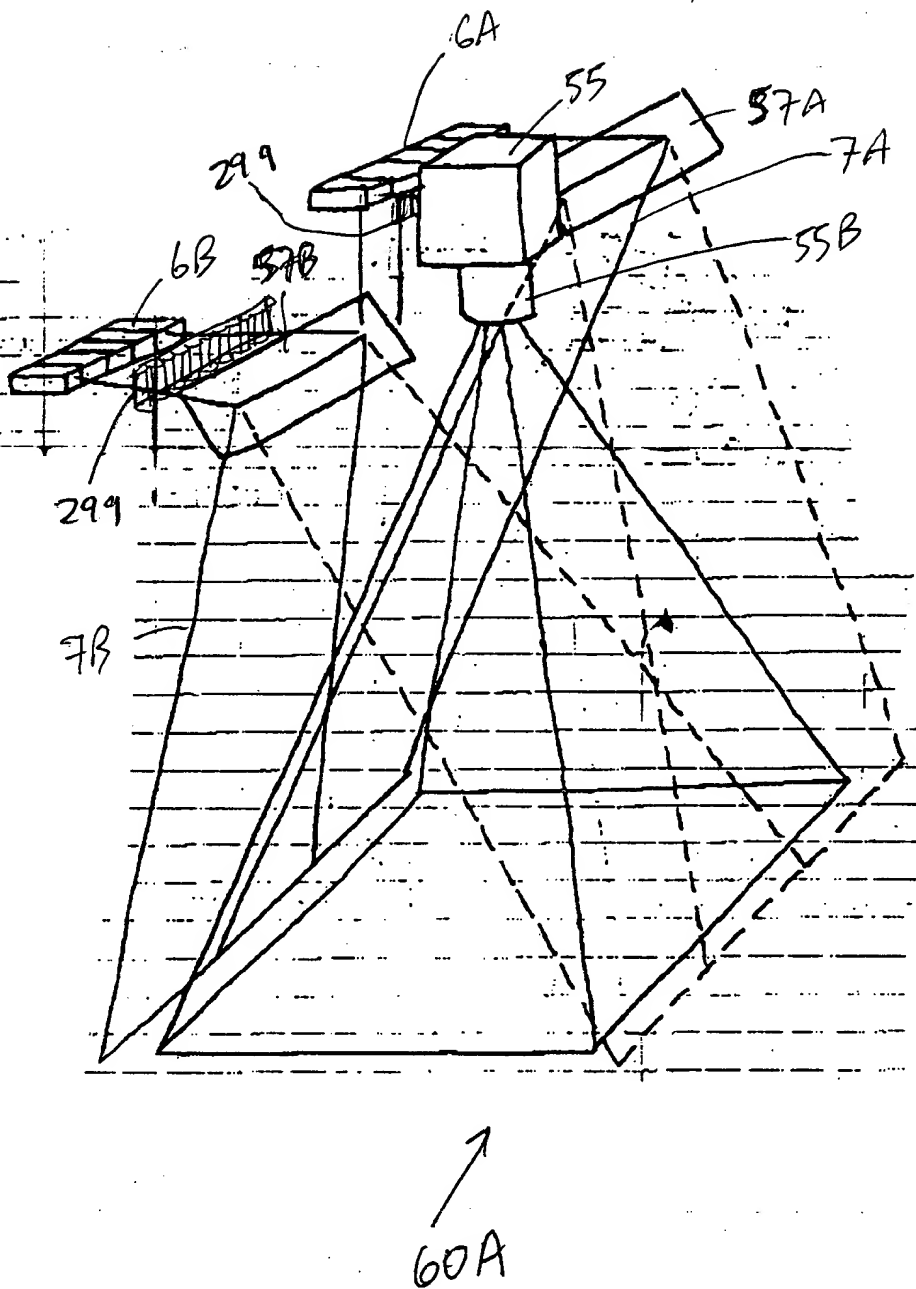


FIG. 4B1





FIG. 4B Z

FIG. 4B3

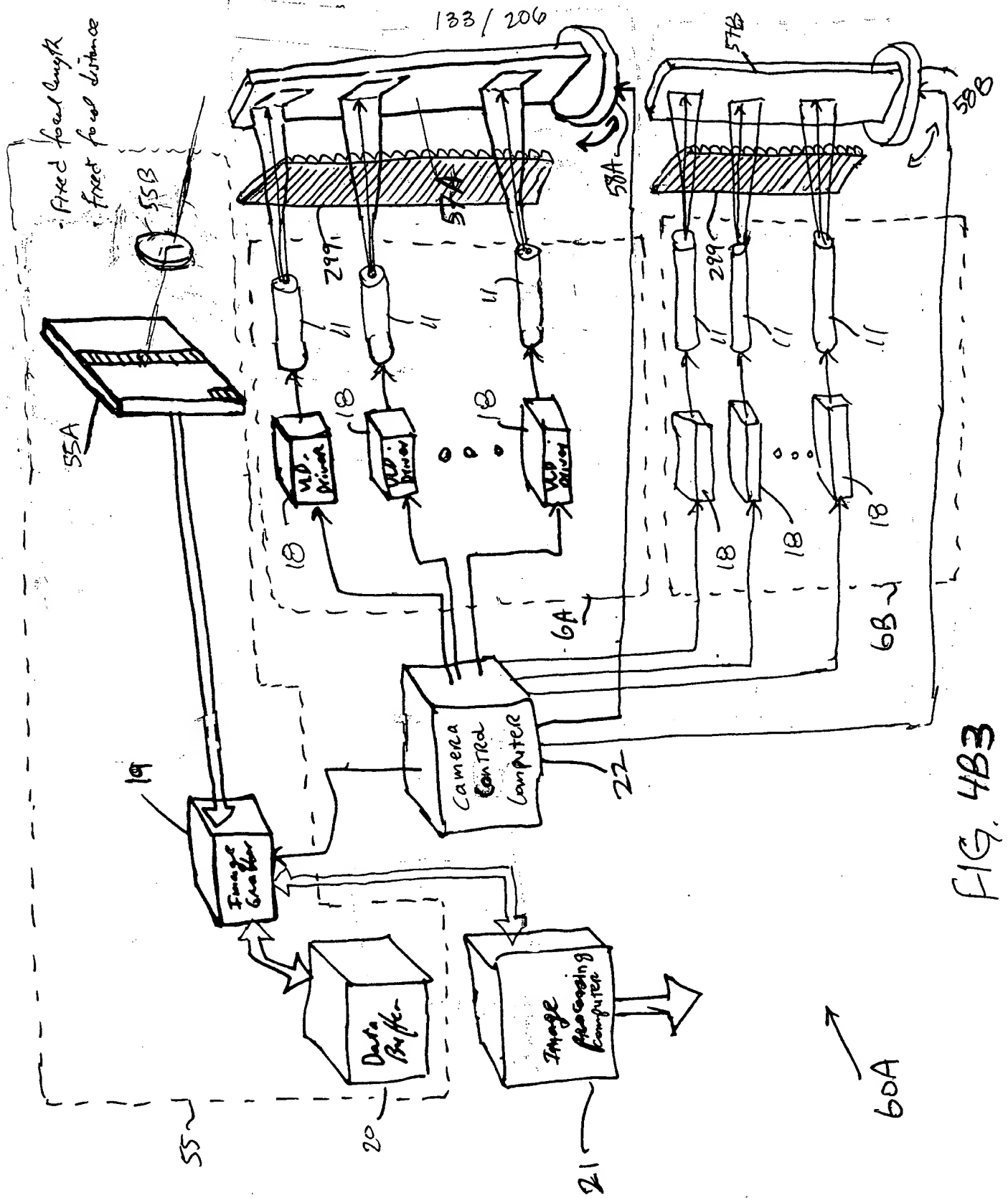


FIG. 4B3

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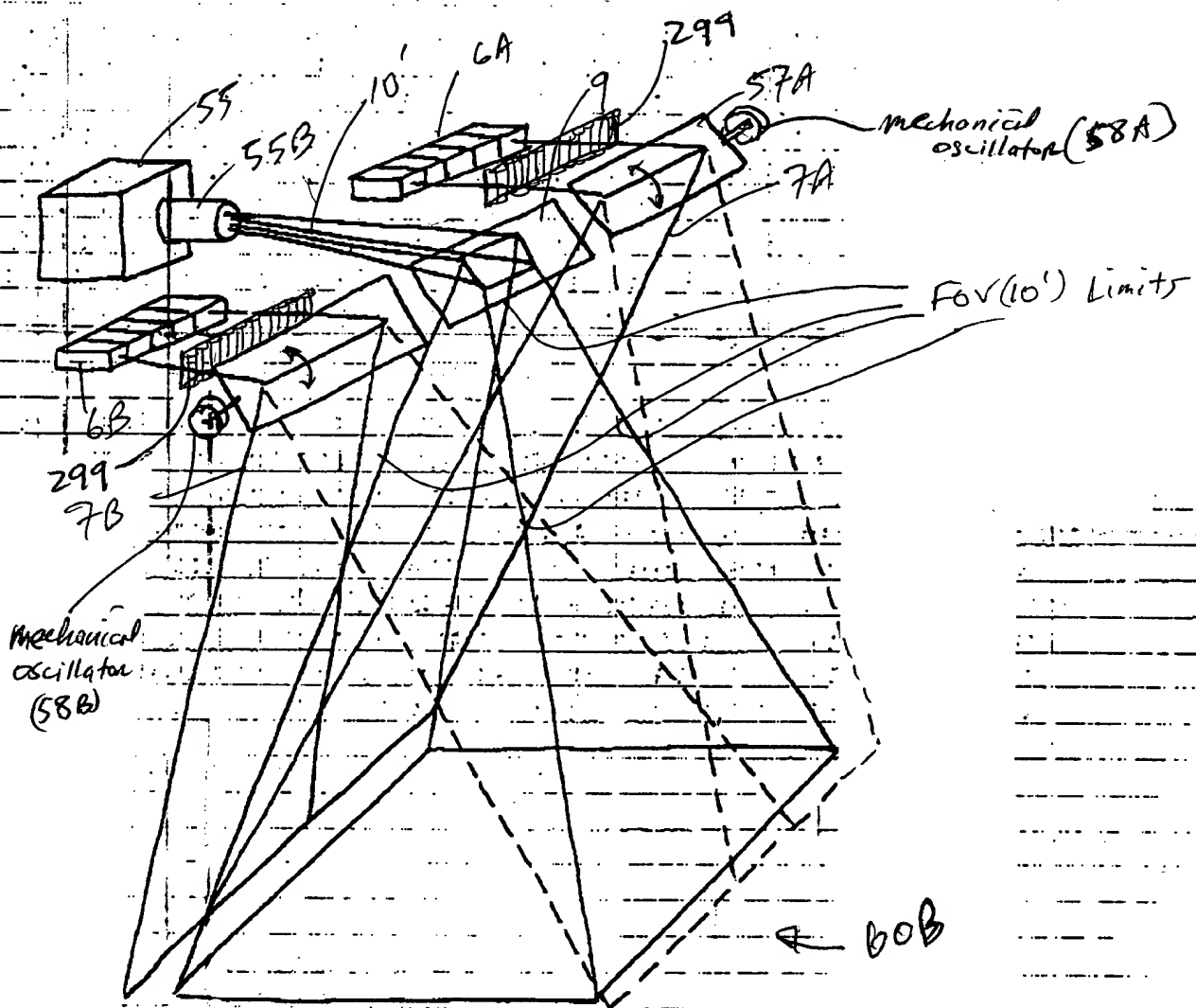


FIG. 4C1

FIG. 4C

FIG. 4C2

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2025 OCT 20 10:50

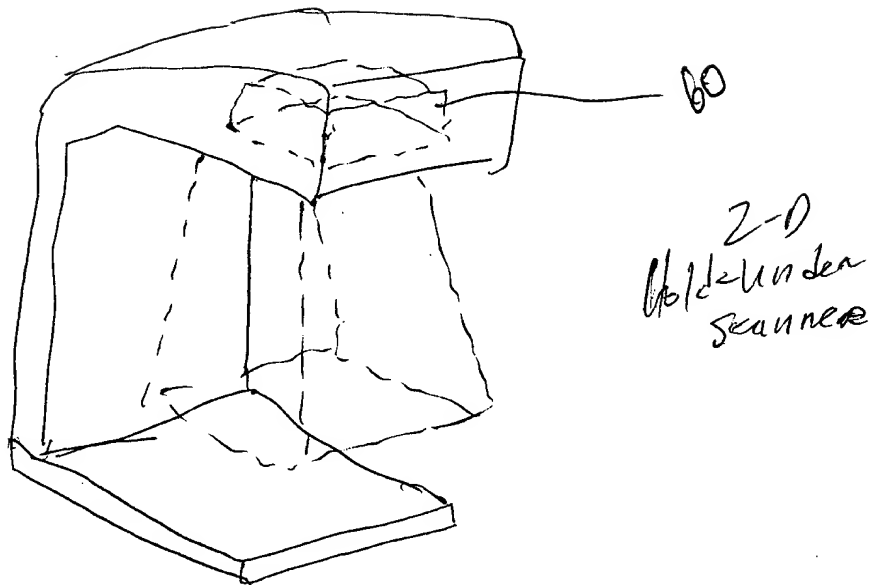
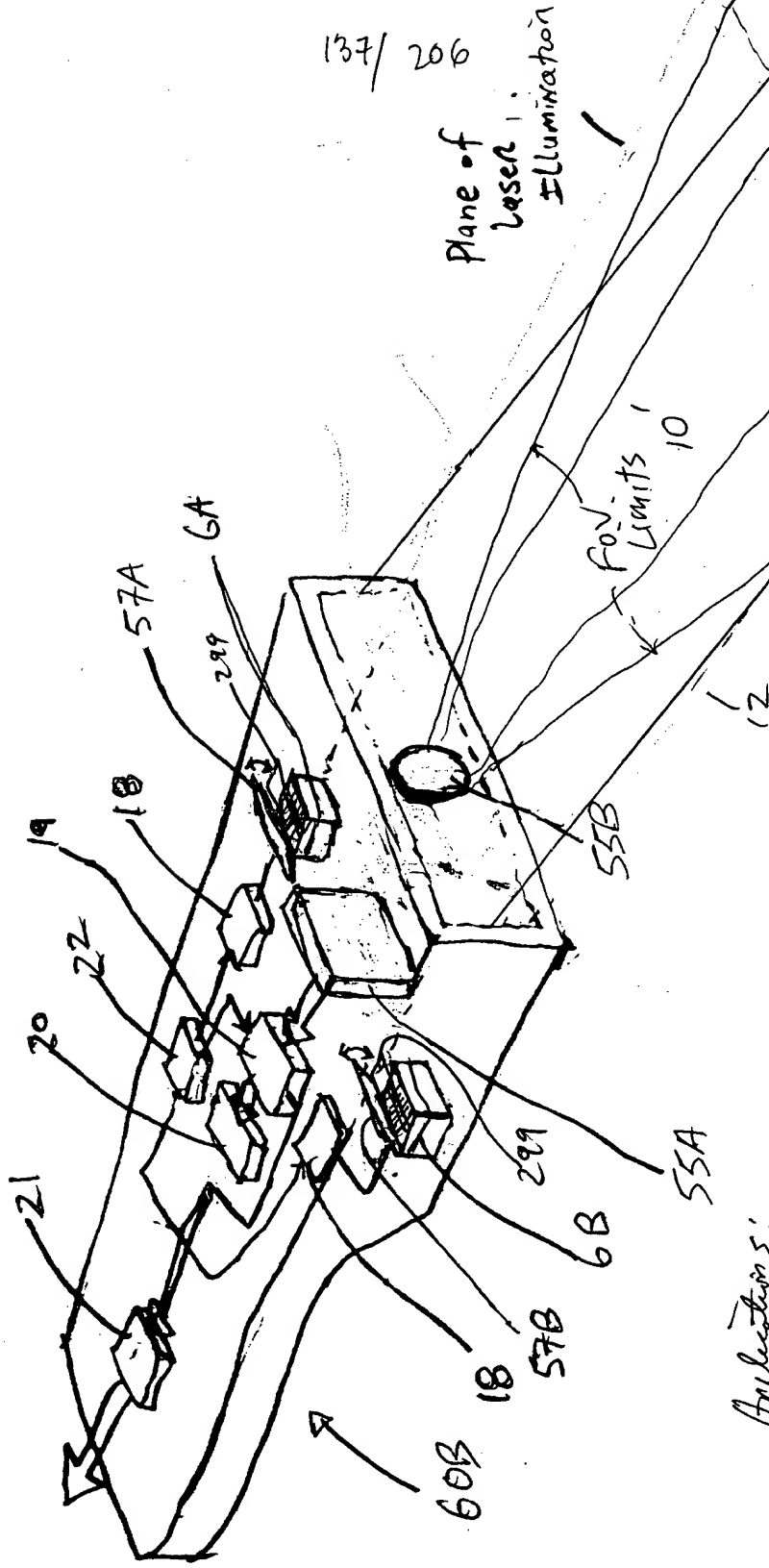


FIG. 4D



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Plane of  
Laser  
Illumination

FOV  
Limits  
10

FIG. 4E

- Applications:
- Hand-held Scanner
  - Presentation Scanner



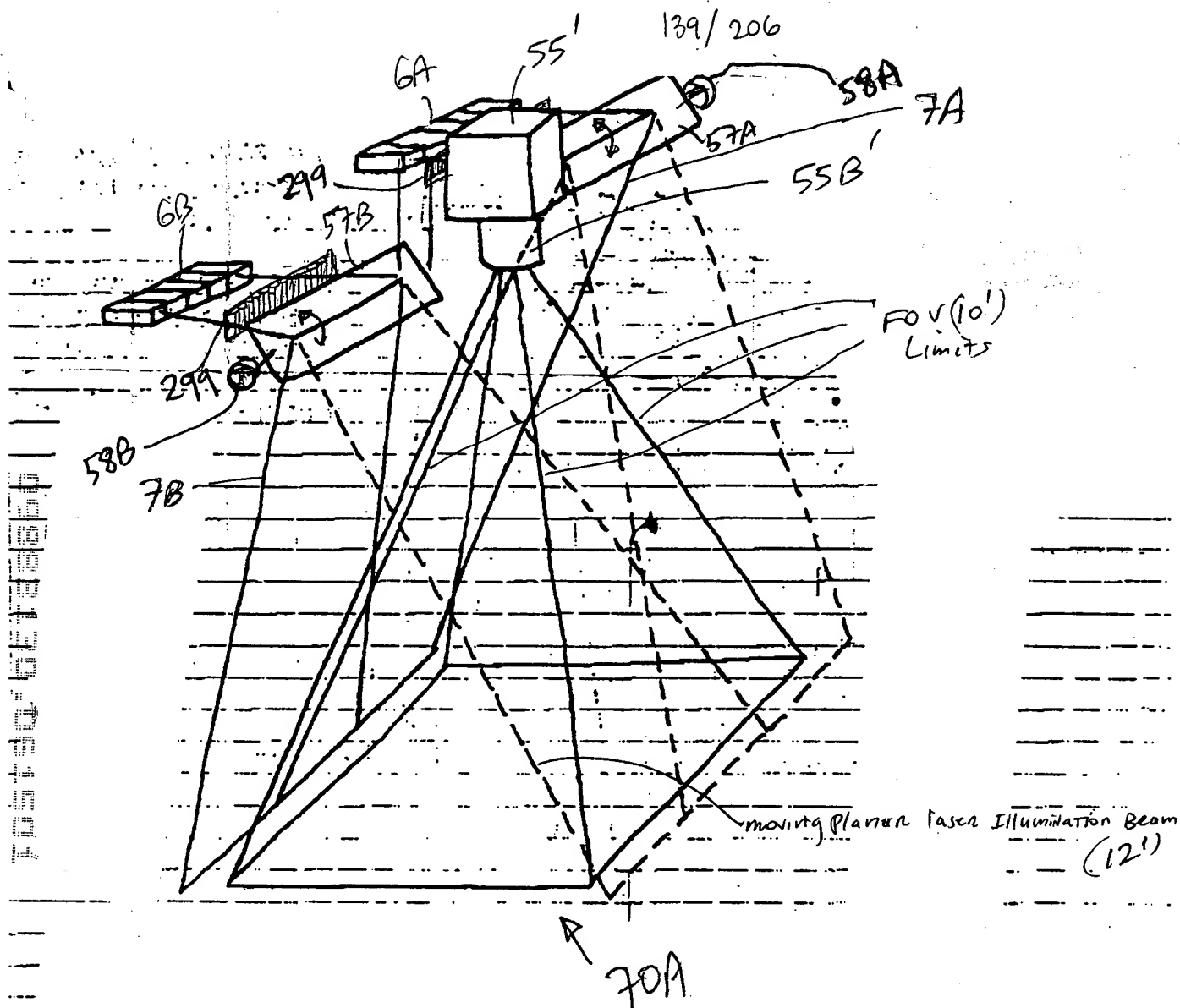


FIG 5B1



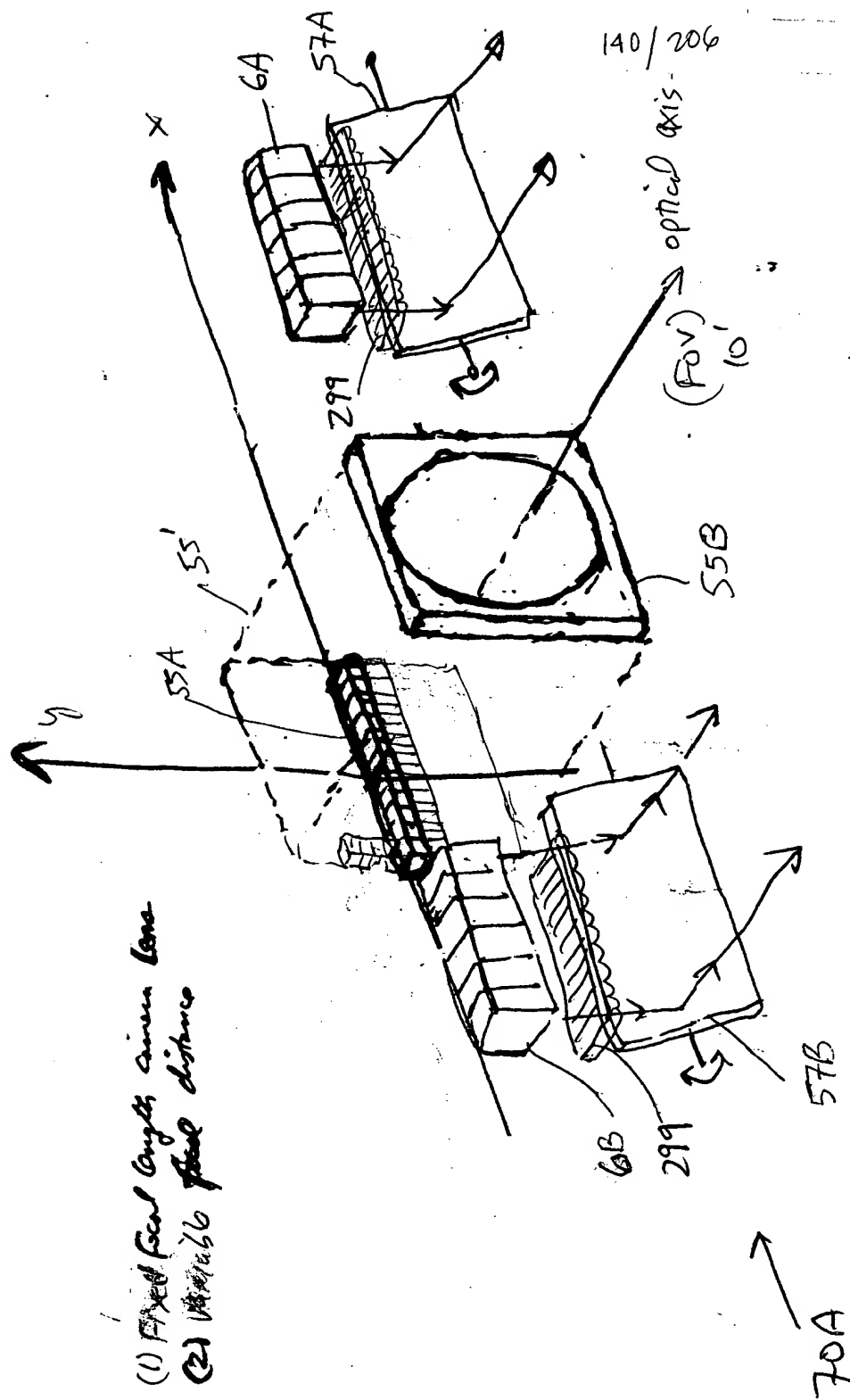


FIG. 5B2

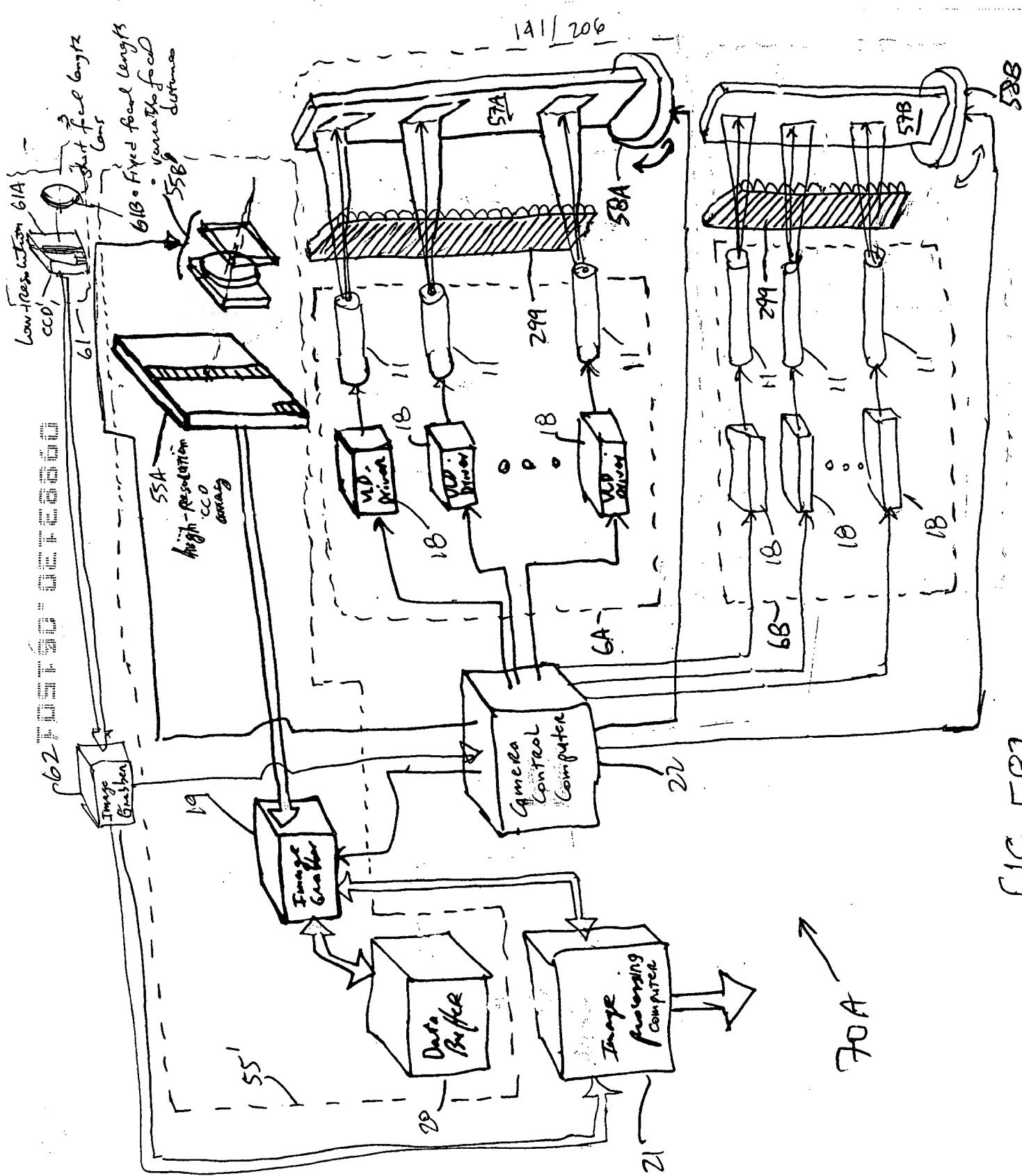


FIG. 5B3

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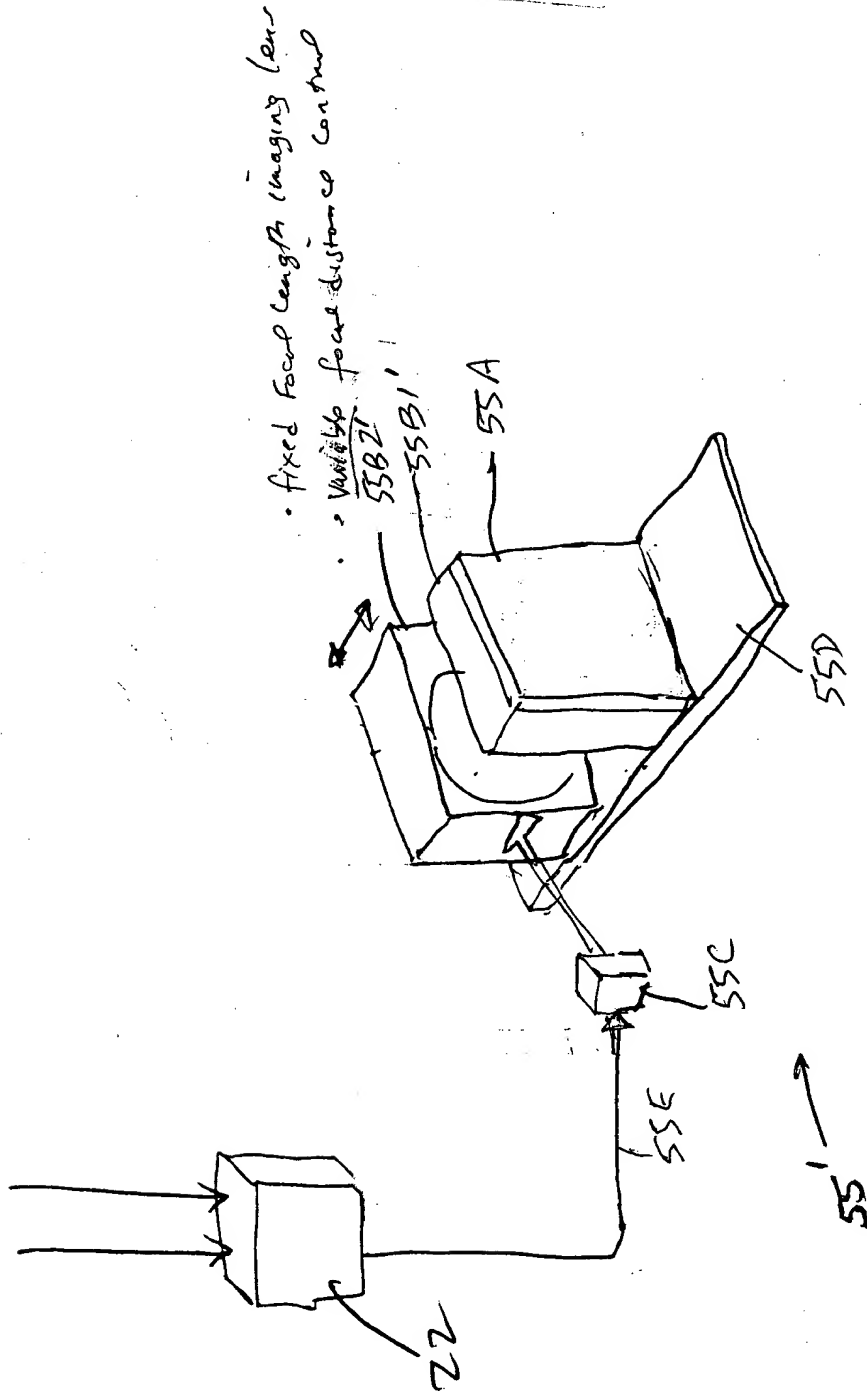


FIG. 5B4

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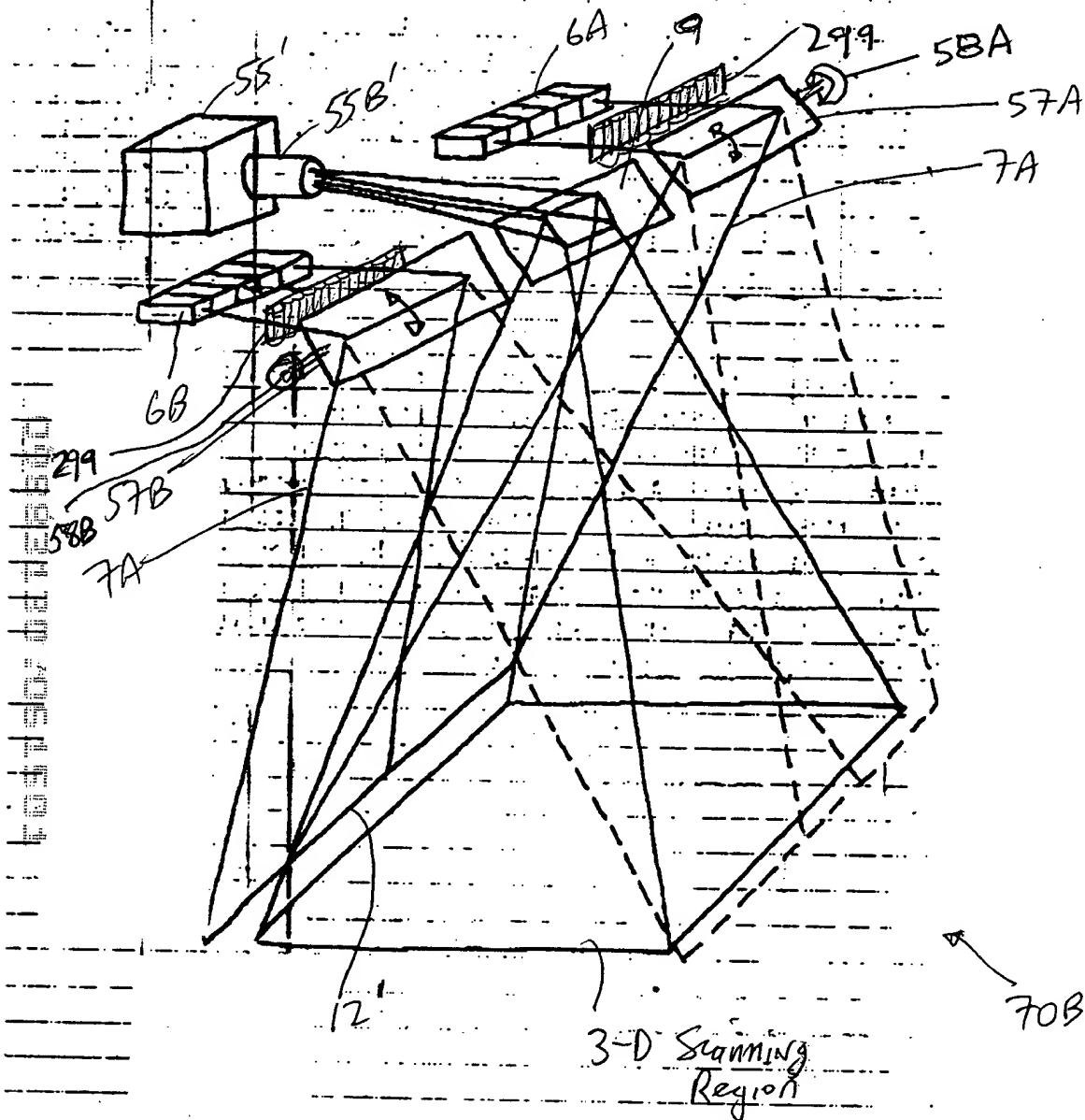


FIG. 5C1

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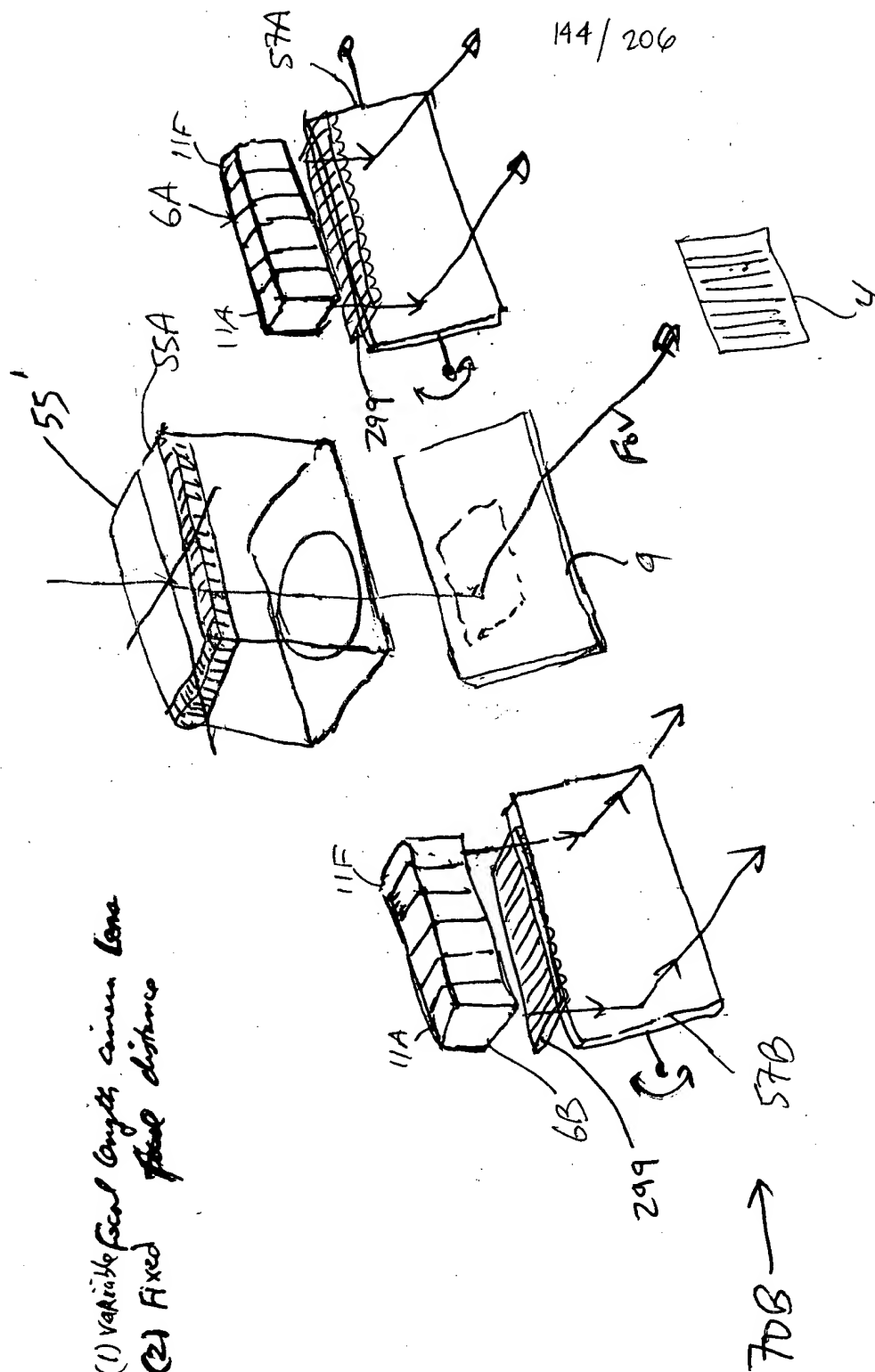


FIG. 502



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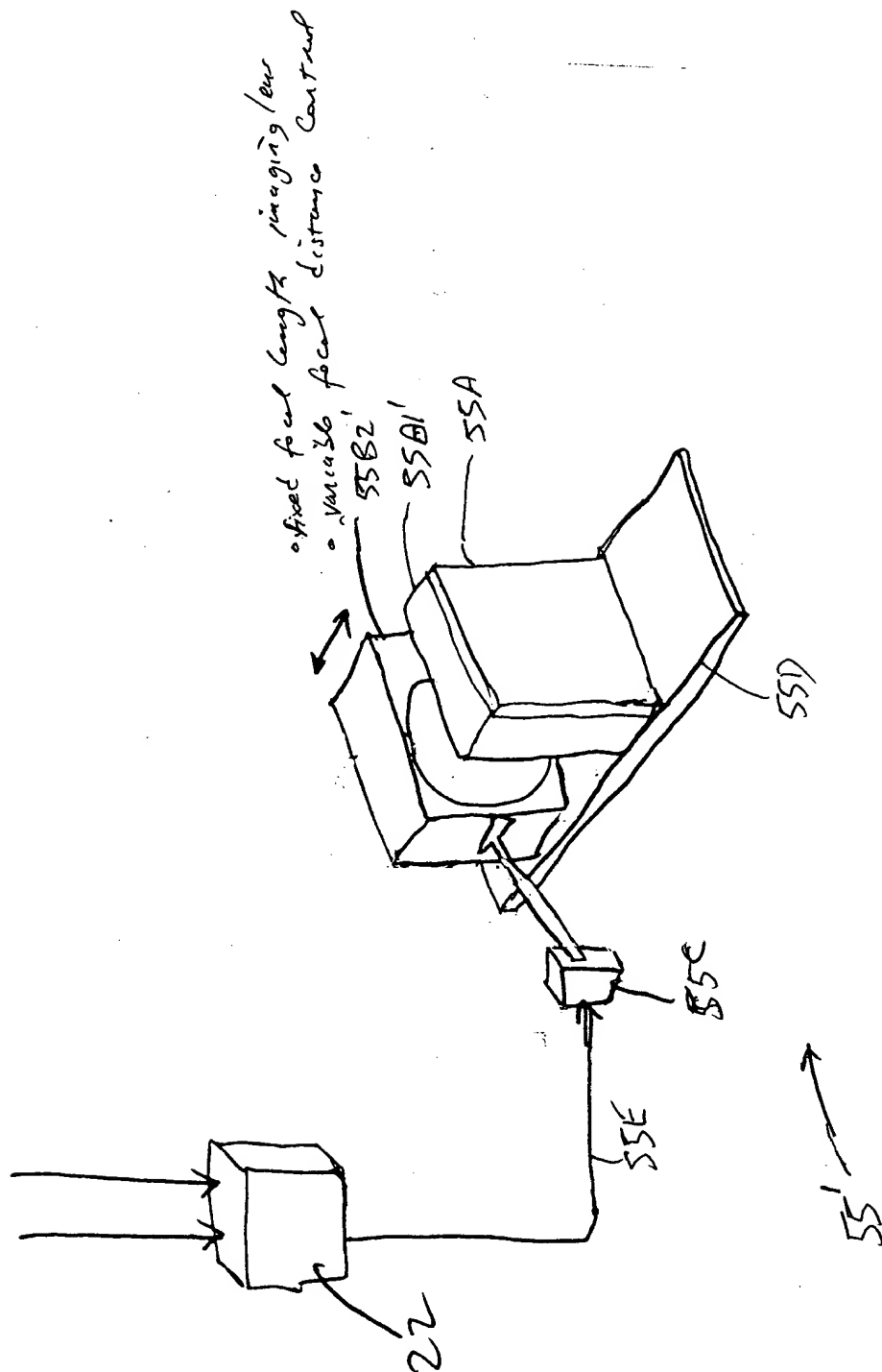


FIG. 5C4

[illegible]

FIG. 5D



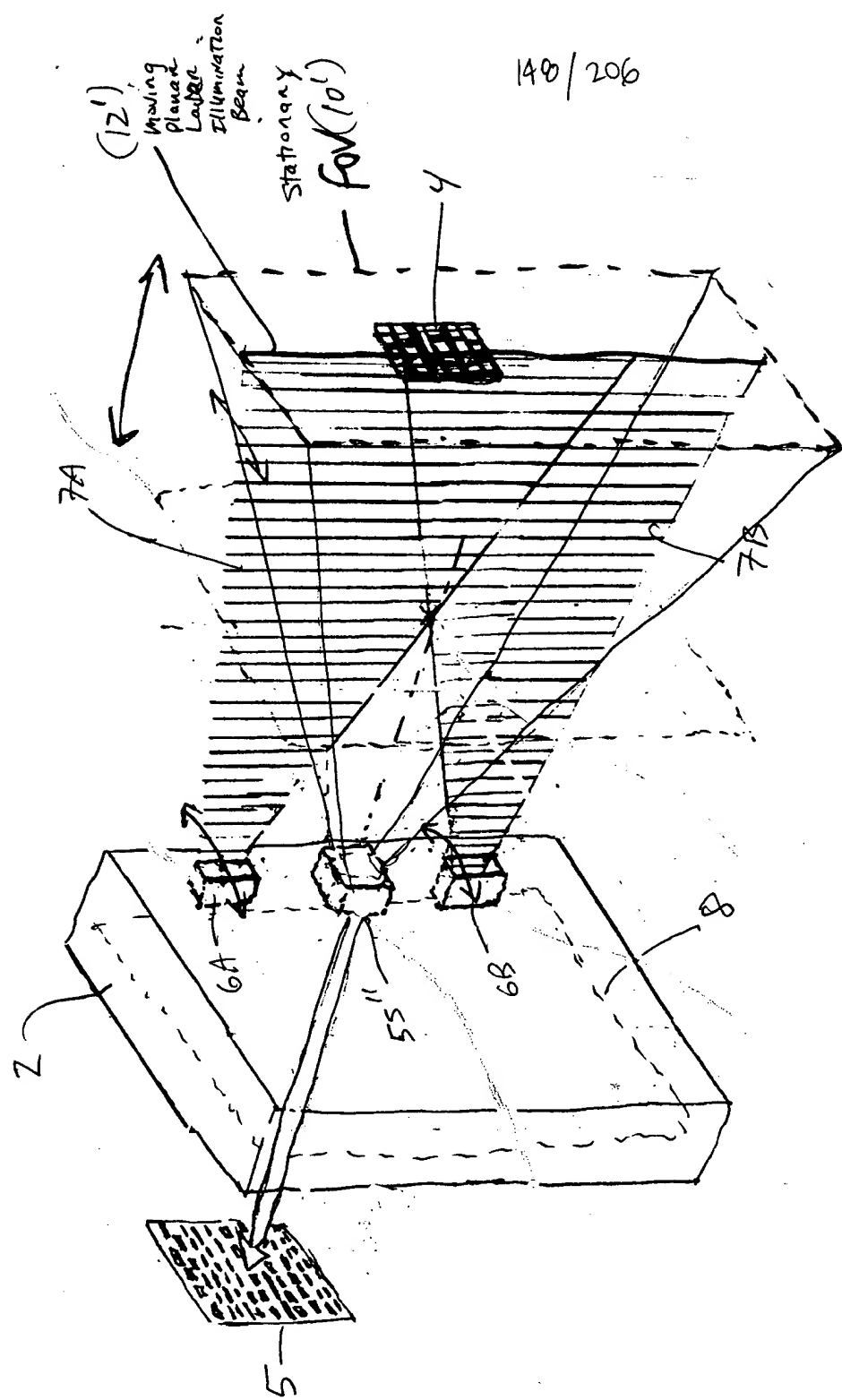
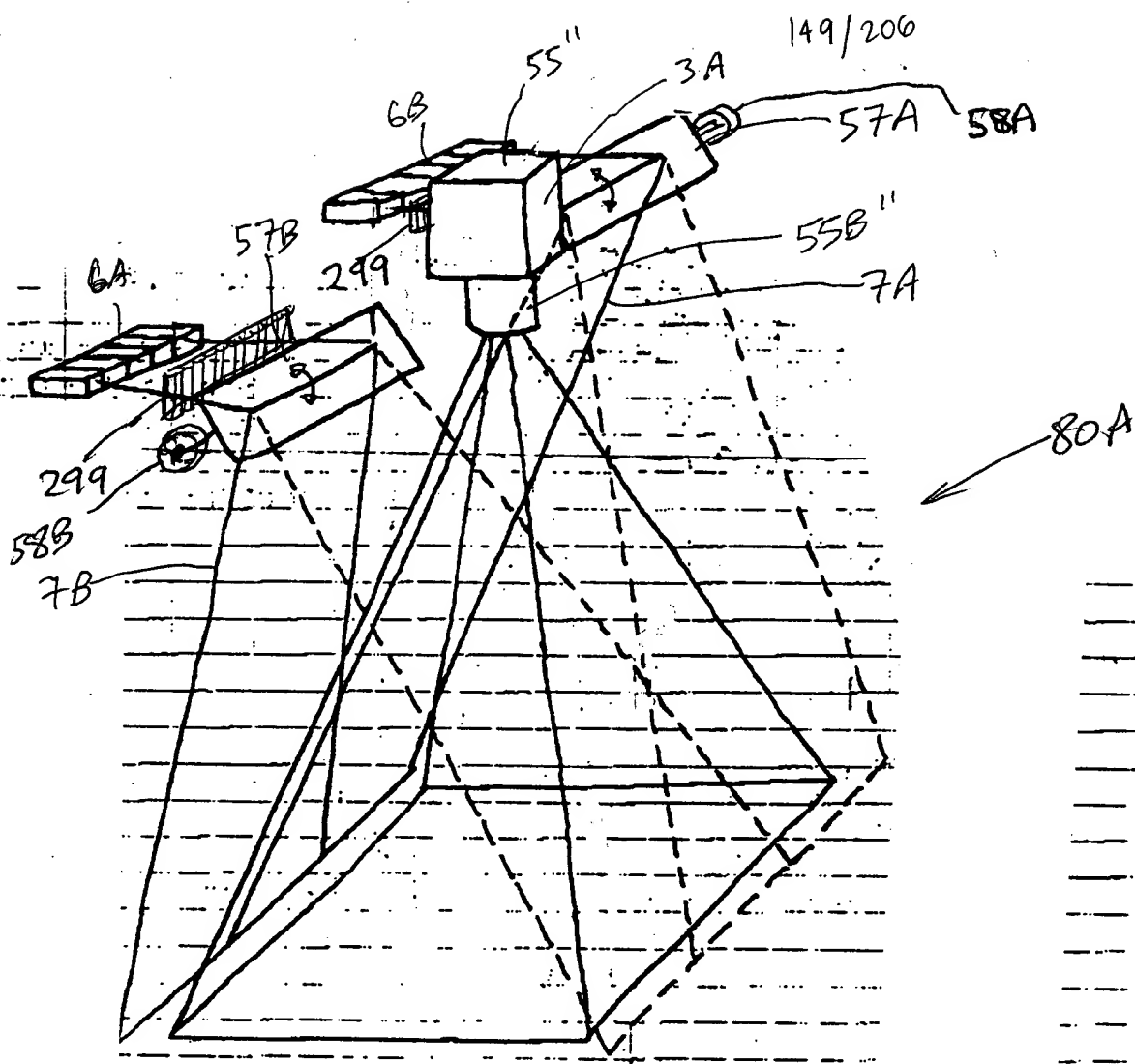


FIG. 6A

80



[illegible]

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30A

FIG. 6B2

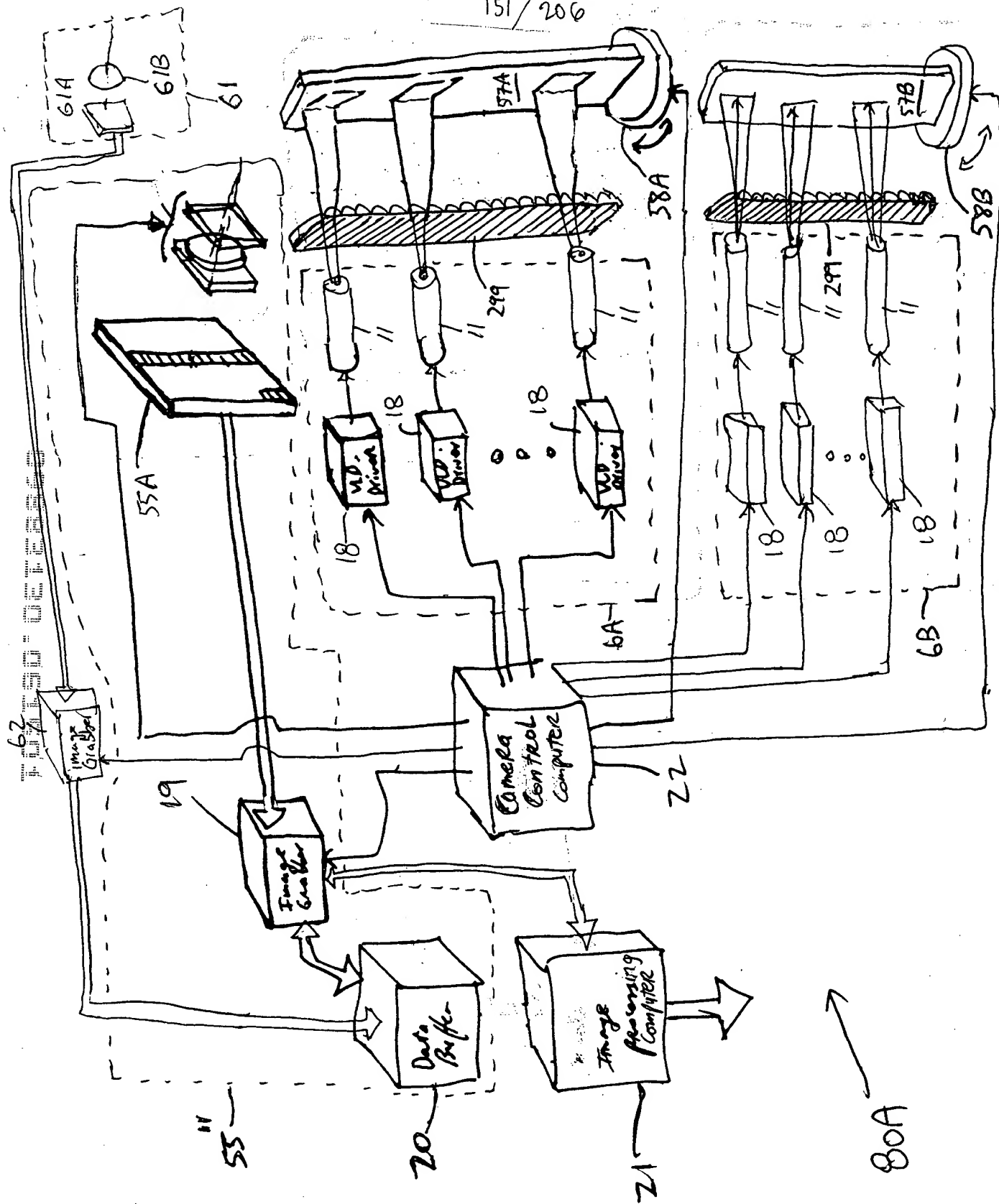


FIG. 6B3

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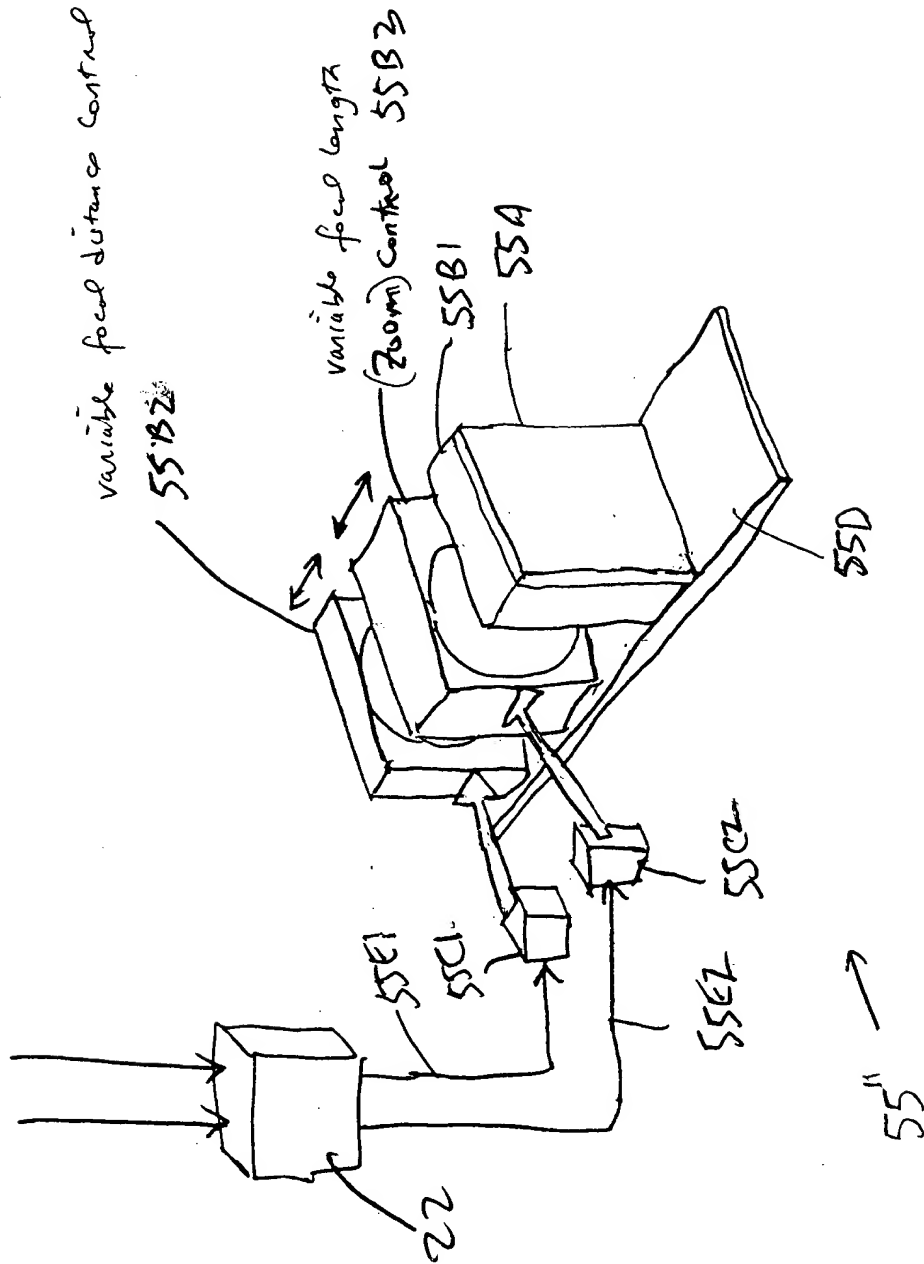


FIG. 6B4

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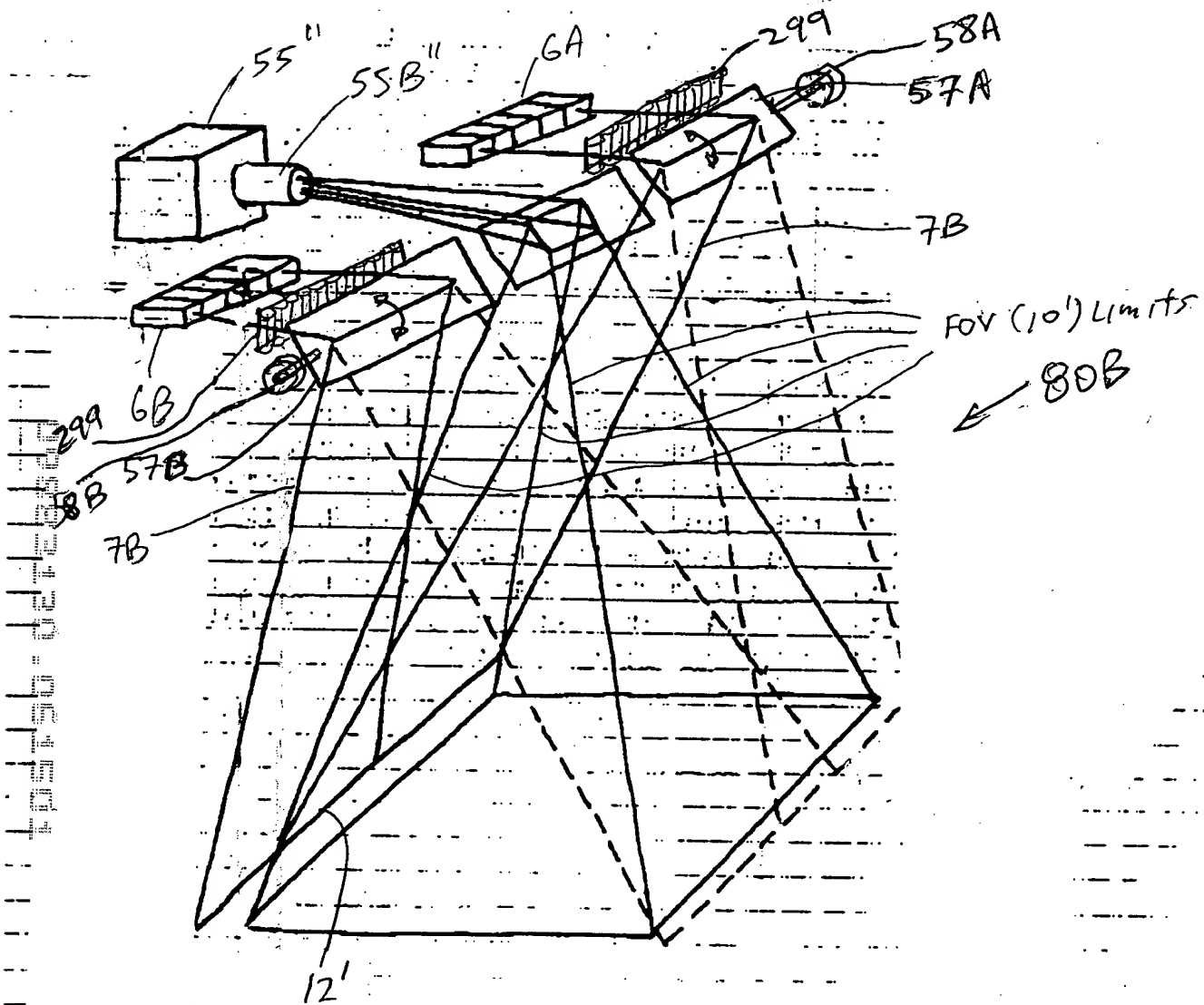
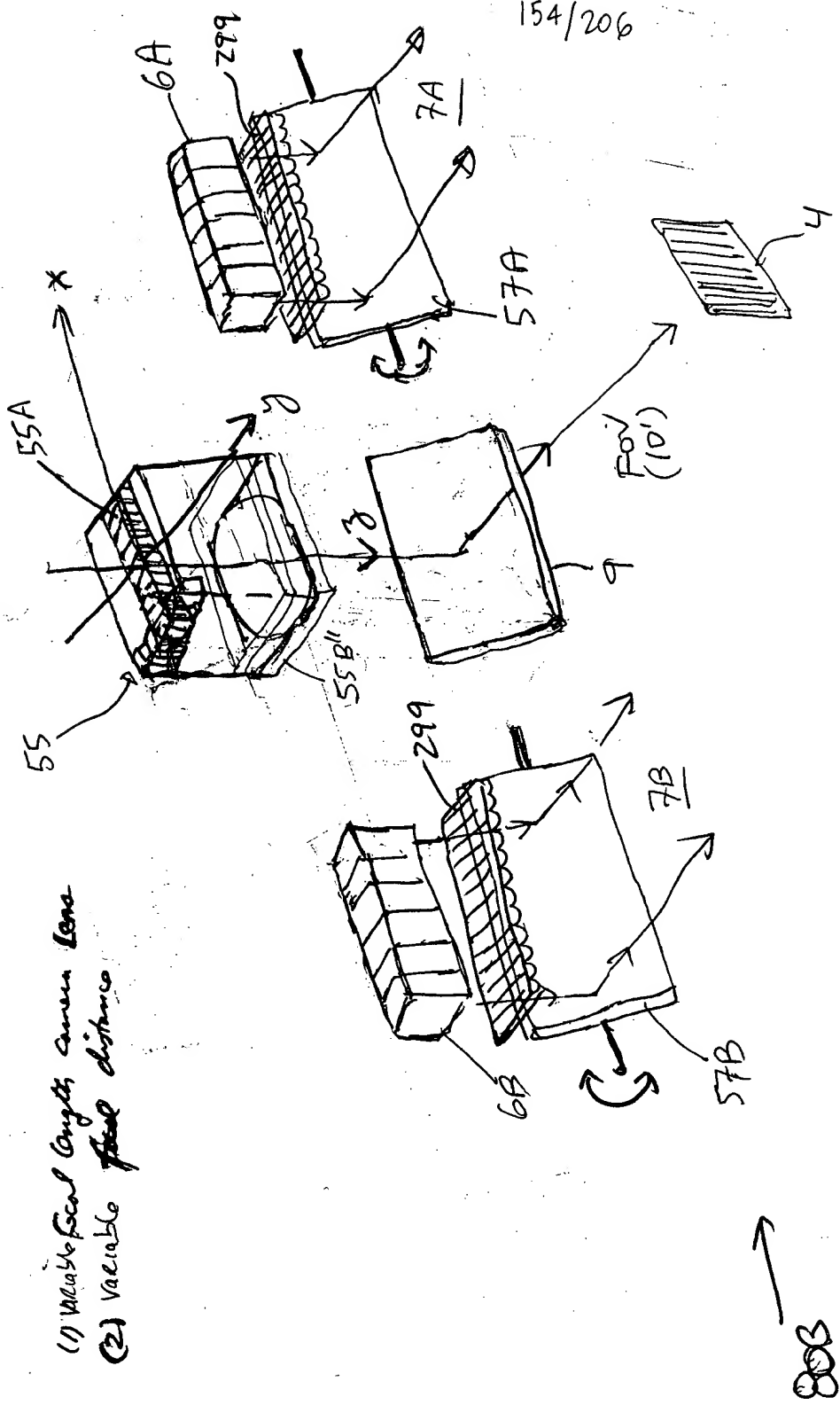


FIG. 6C1

FOOTNOTES

- (1) Variable focal length camera lens
- (2) Variable focal distance



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FIG. 6C2

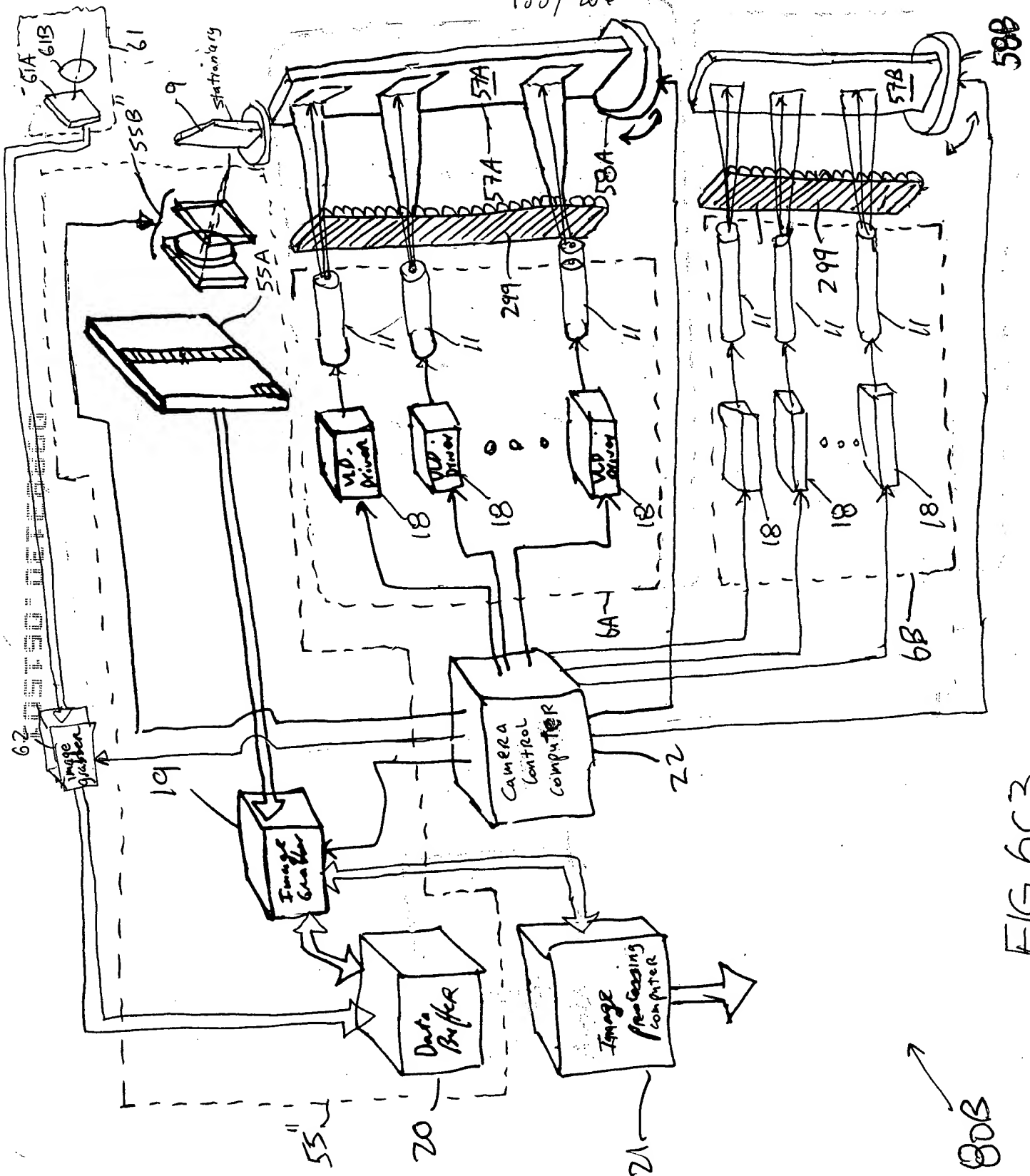


FIG. 6C3



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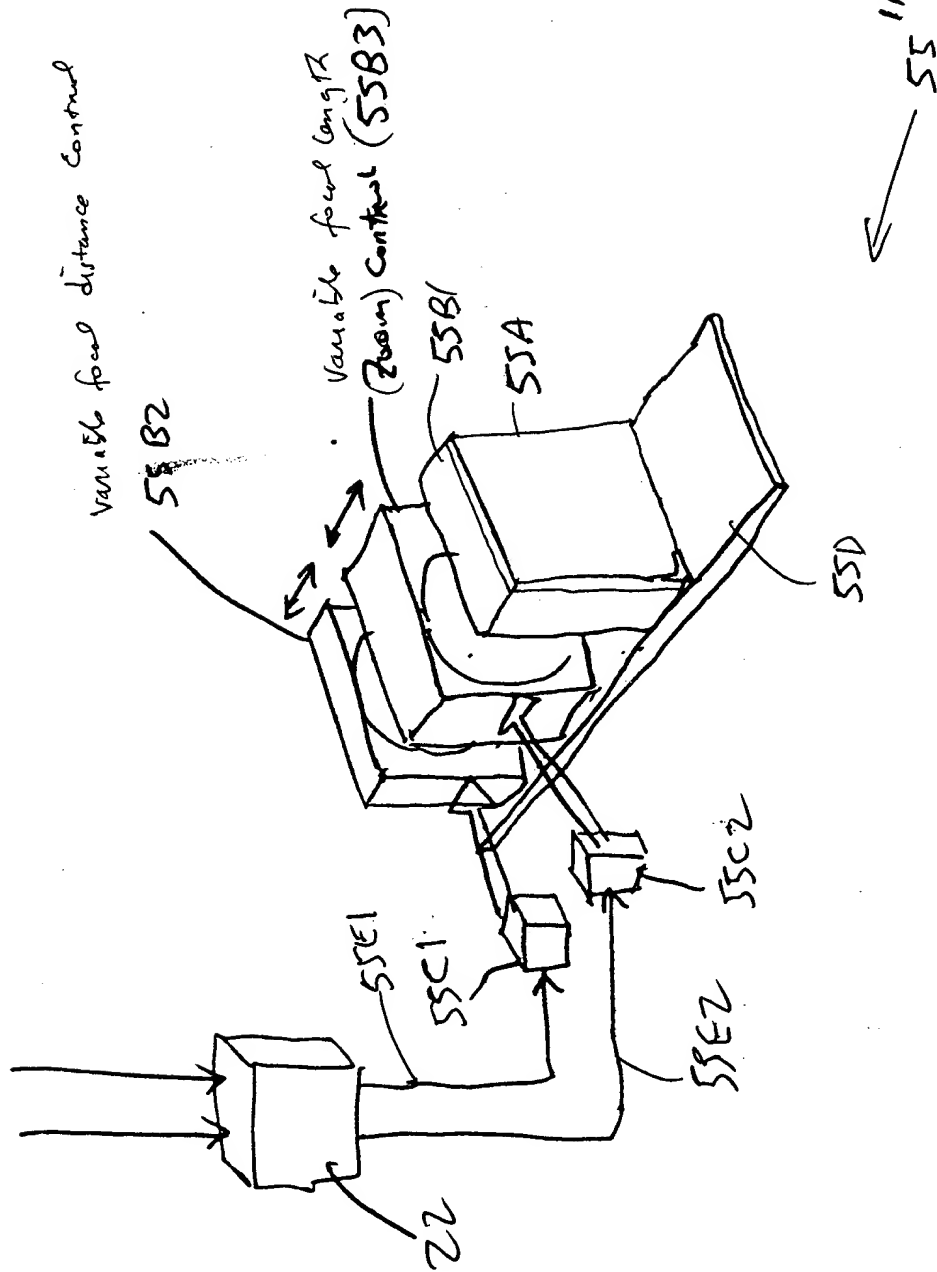


FIG. 6C4

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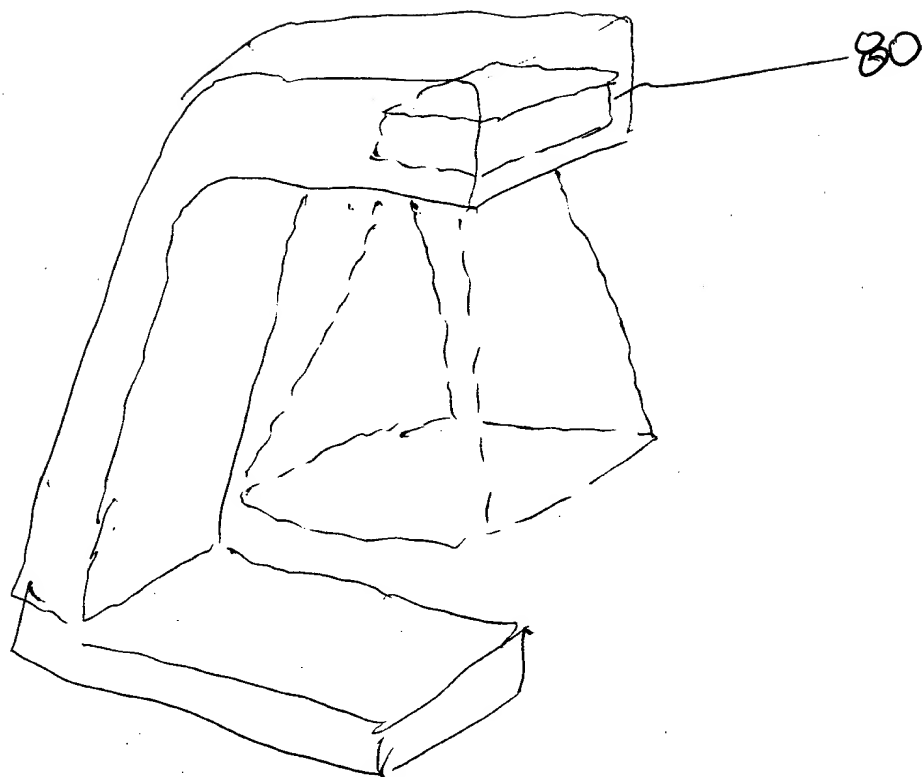


FIG. 6C5

FIG. 6C5

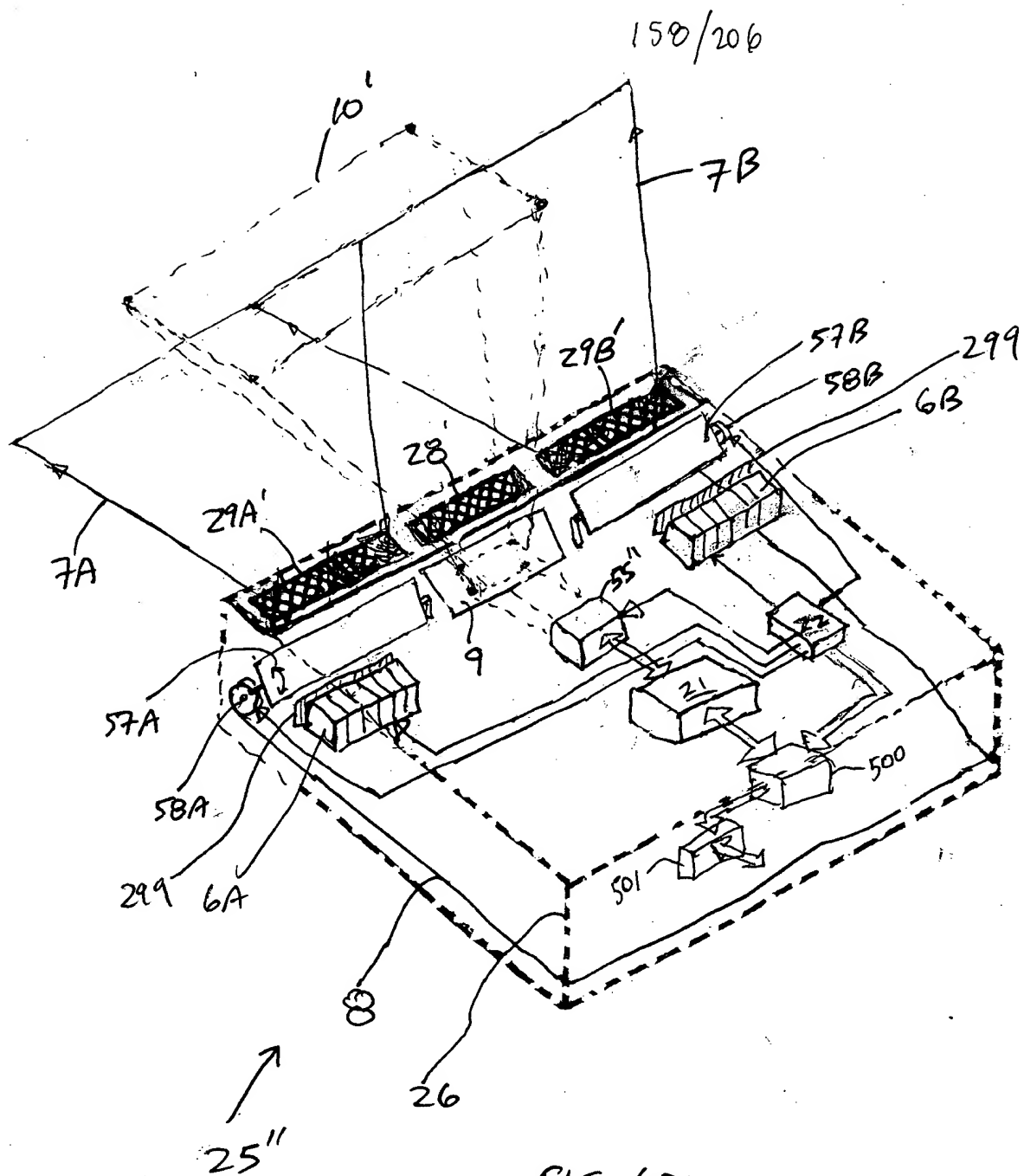


FIG. 6D1

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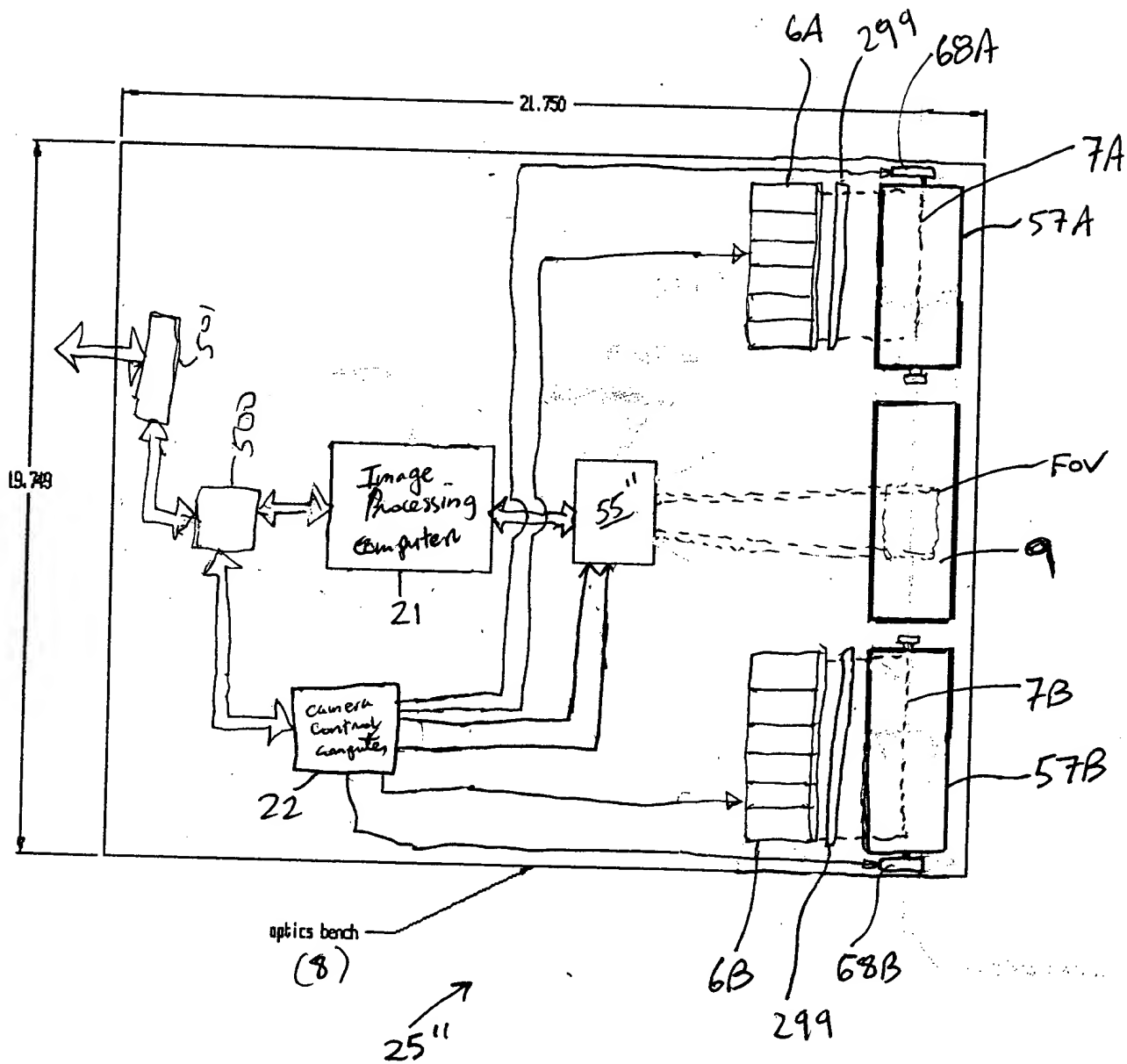
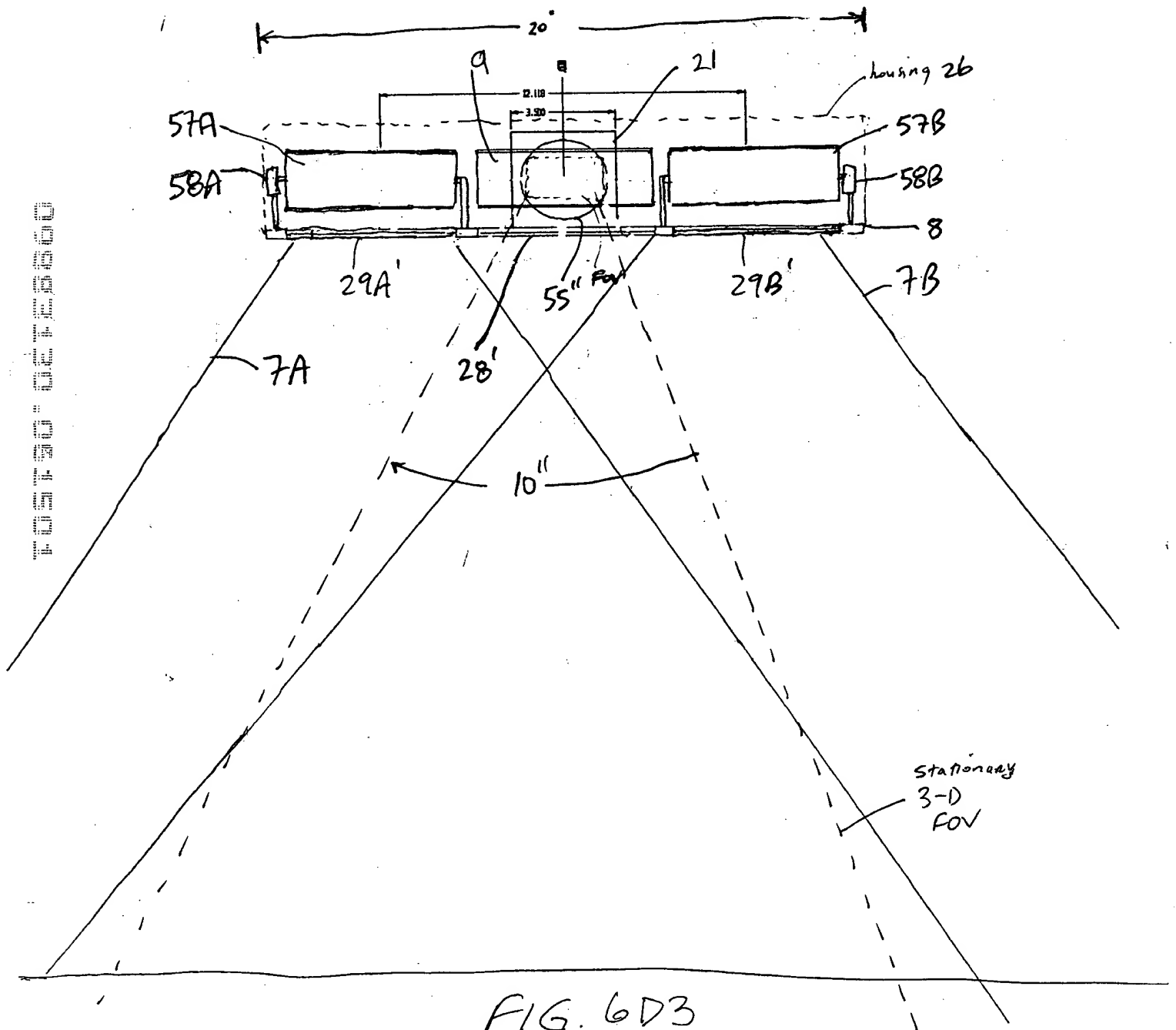


FIG. 6D2

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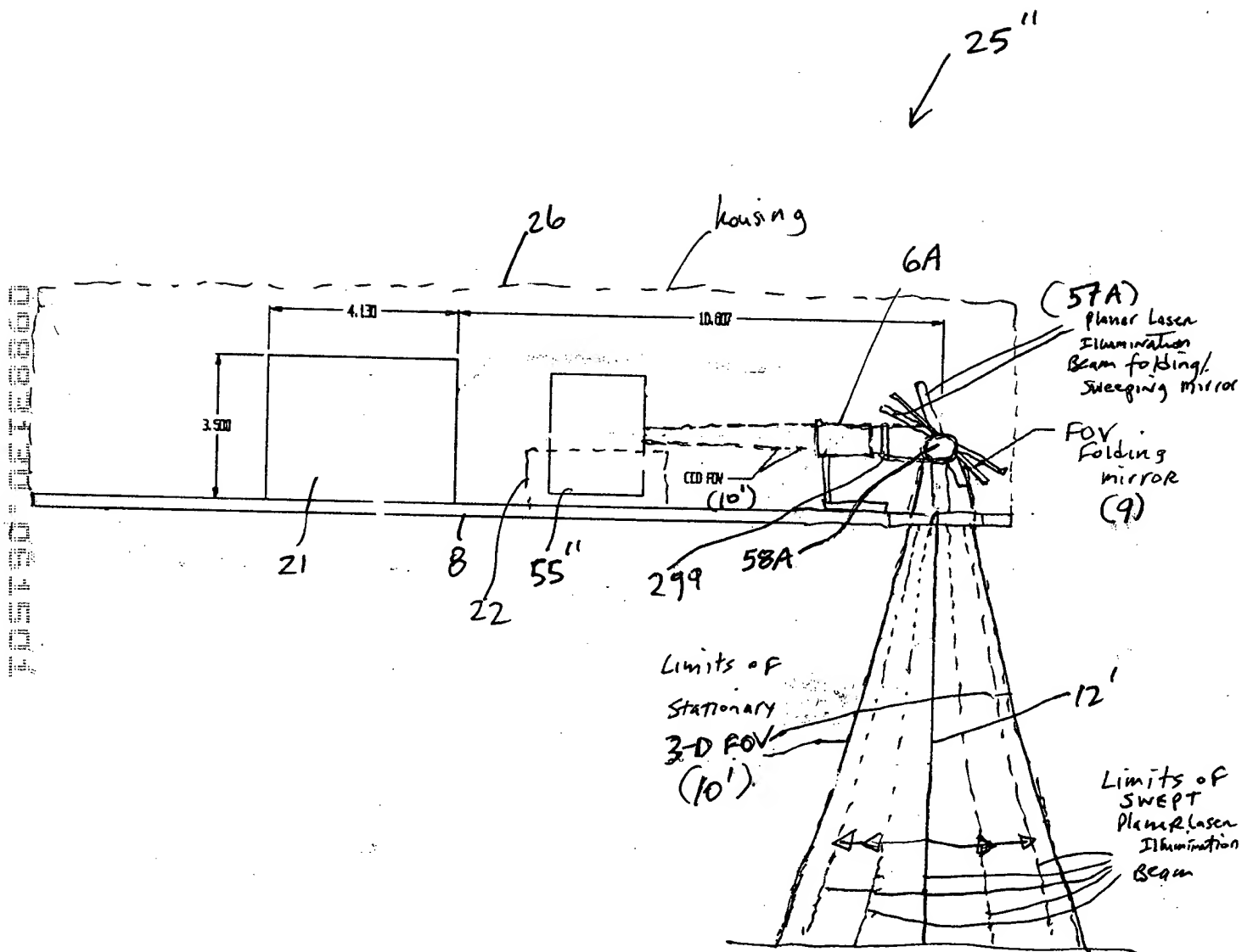


FIG. 6D4

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Variable FOV

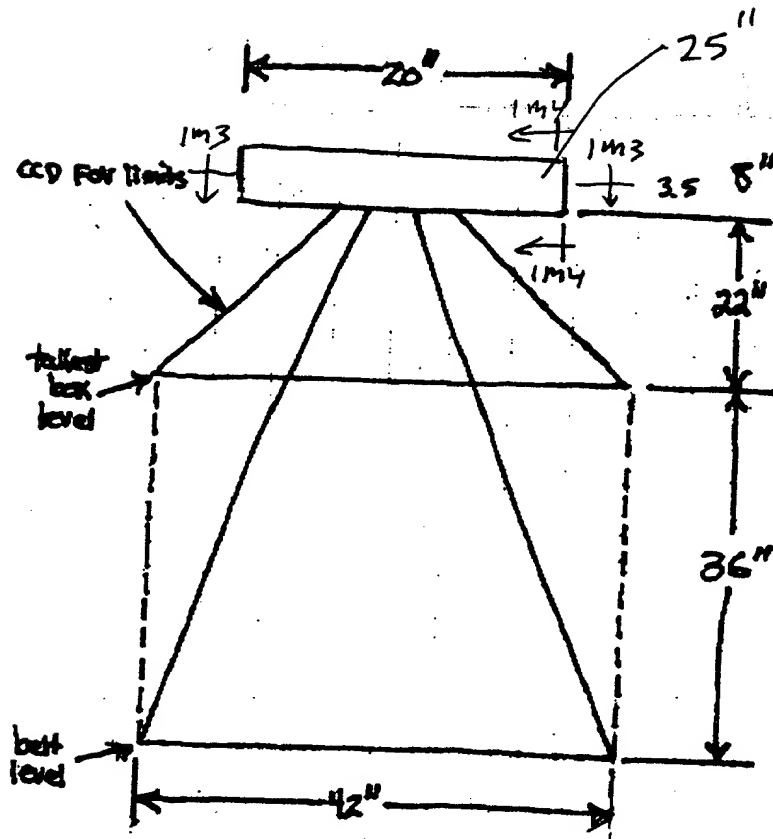


FIG. 6D5

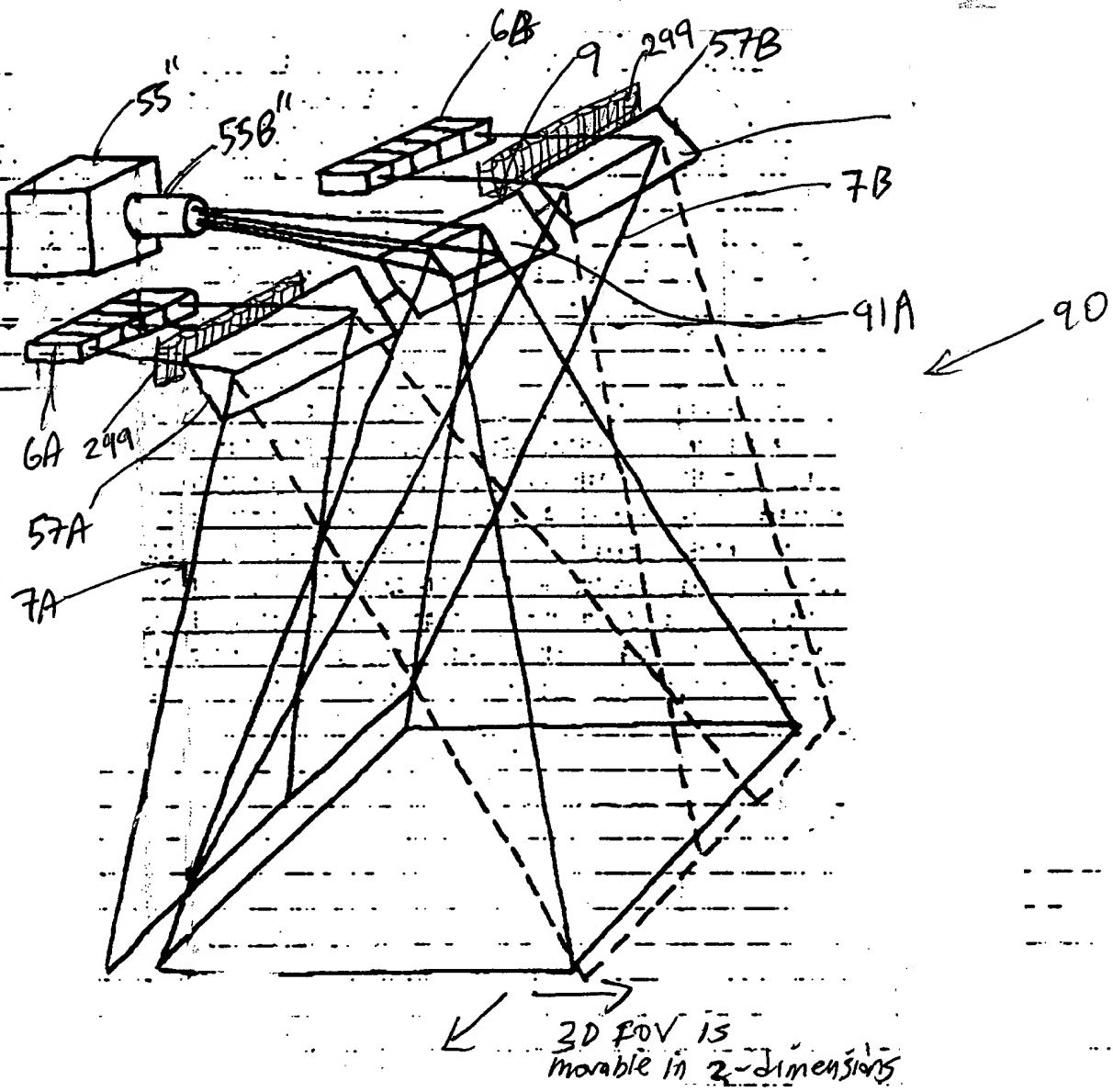
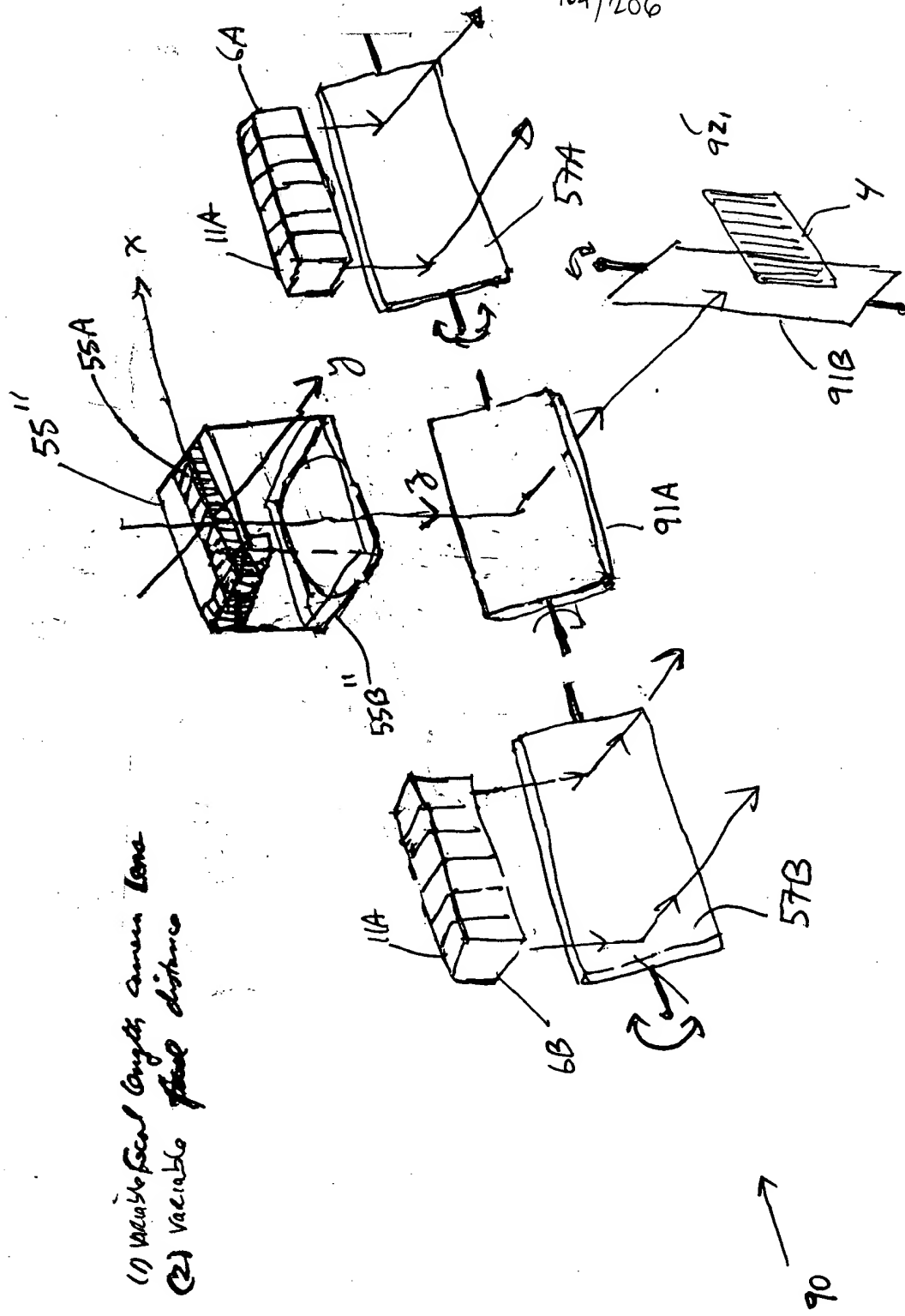


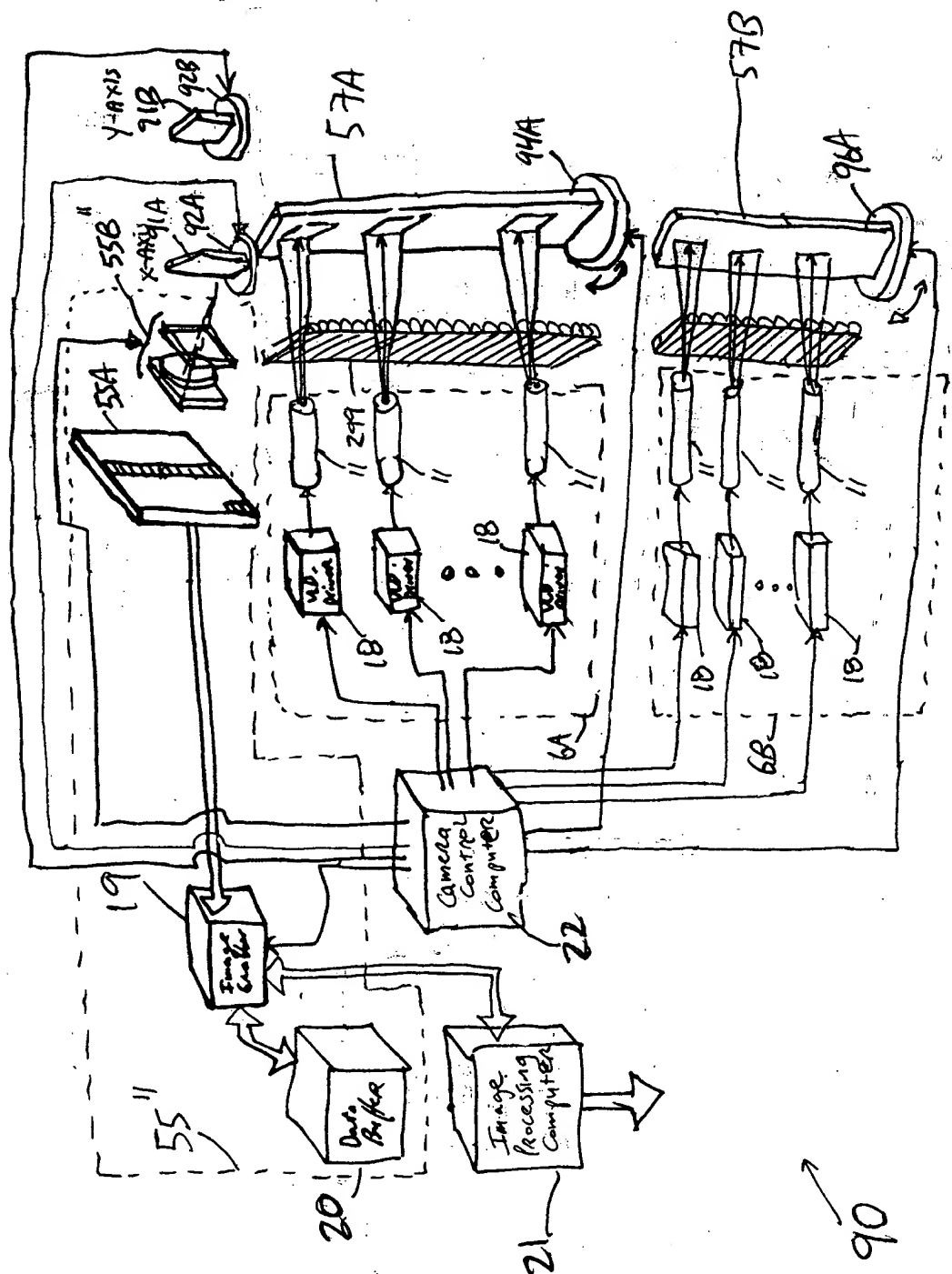
FIG 6E1





(1) Variable length inner line  
(2) Variable fluid distance

FIG. 6E2



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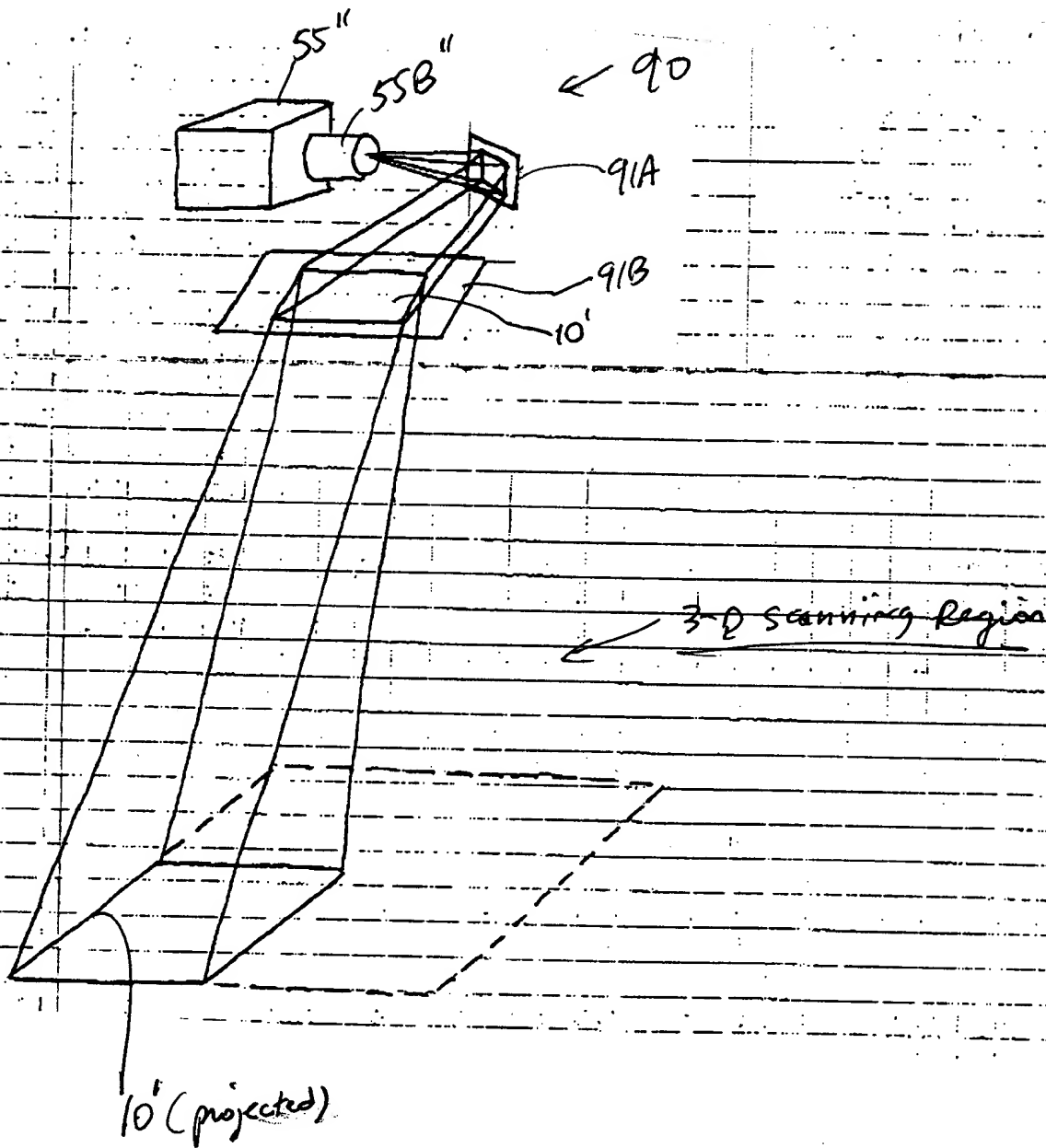


FIG. 6E4

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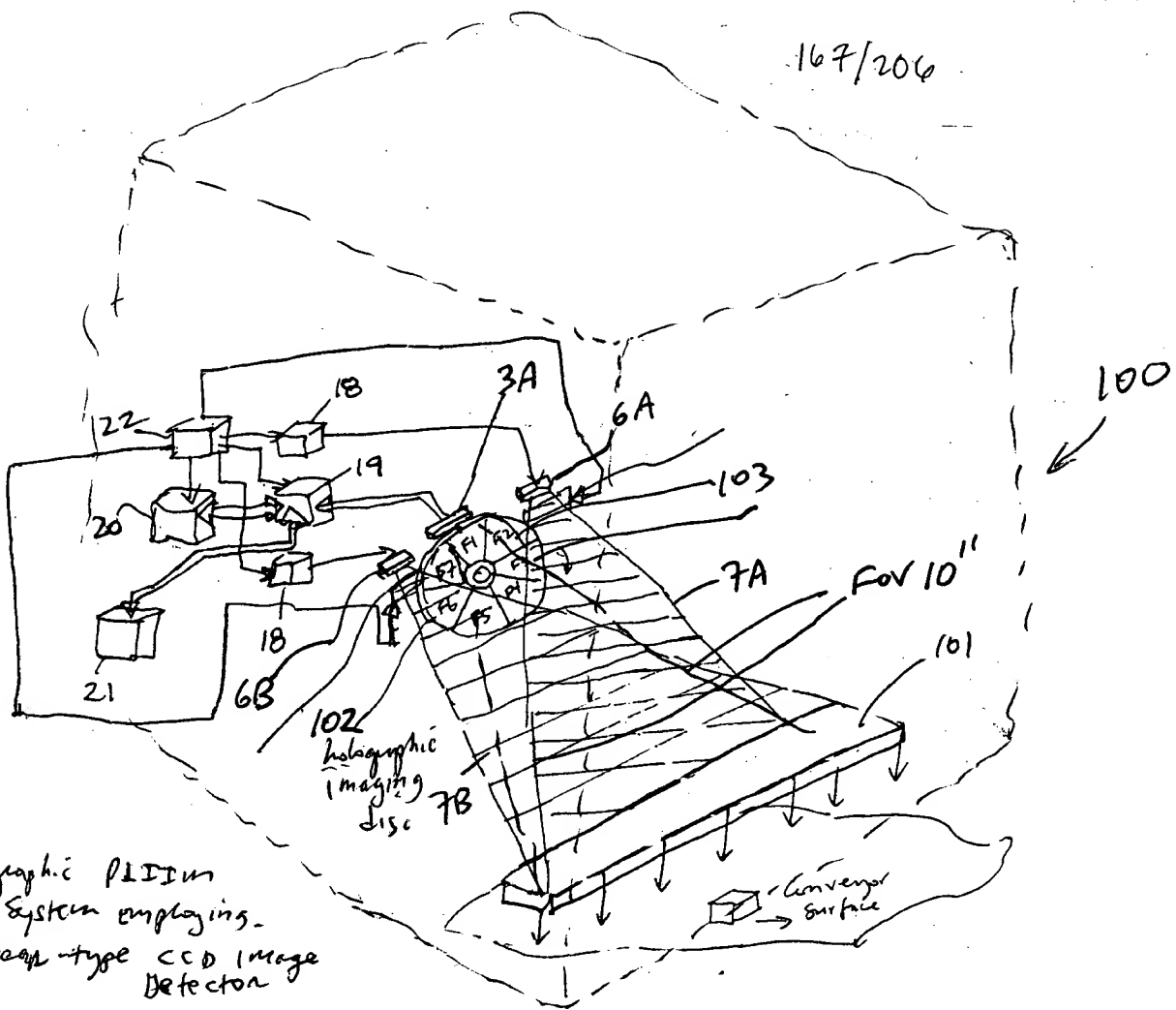


FIG. 7A

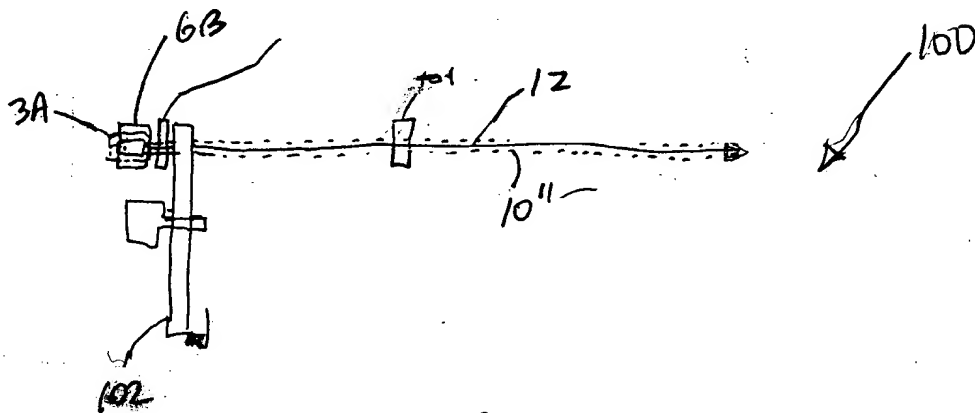


FIG. 7B

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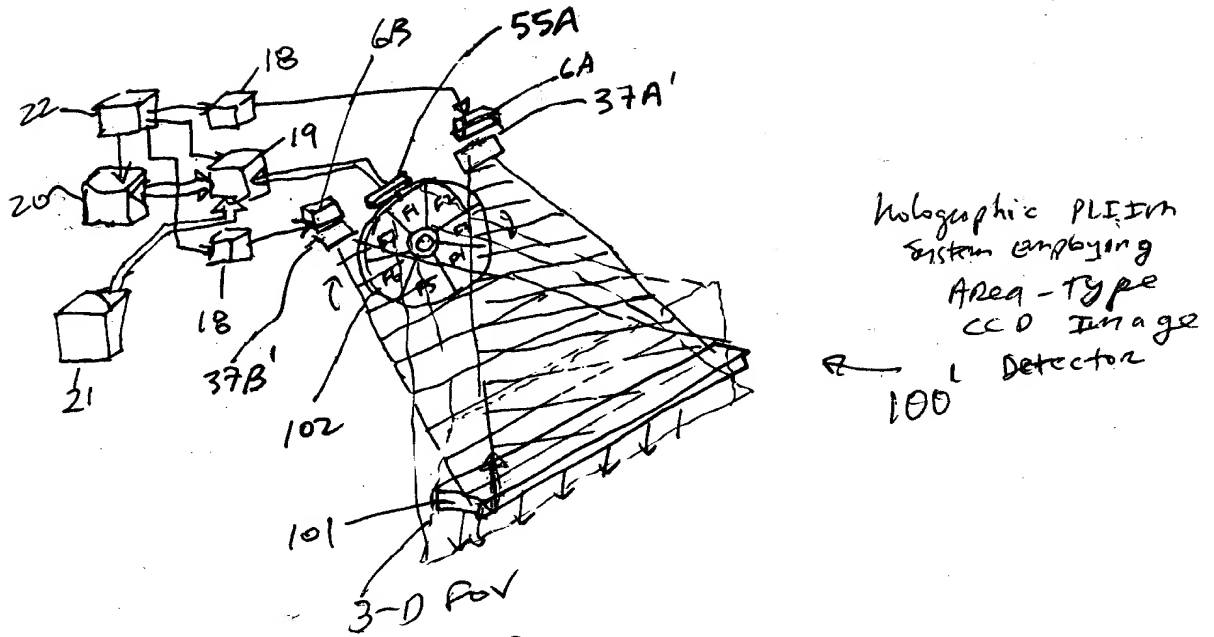


FIG. 8A

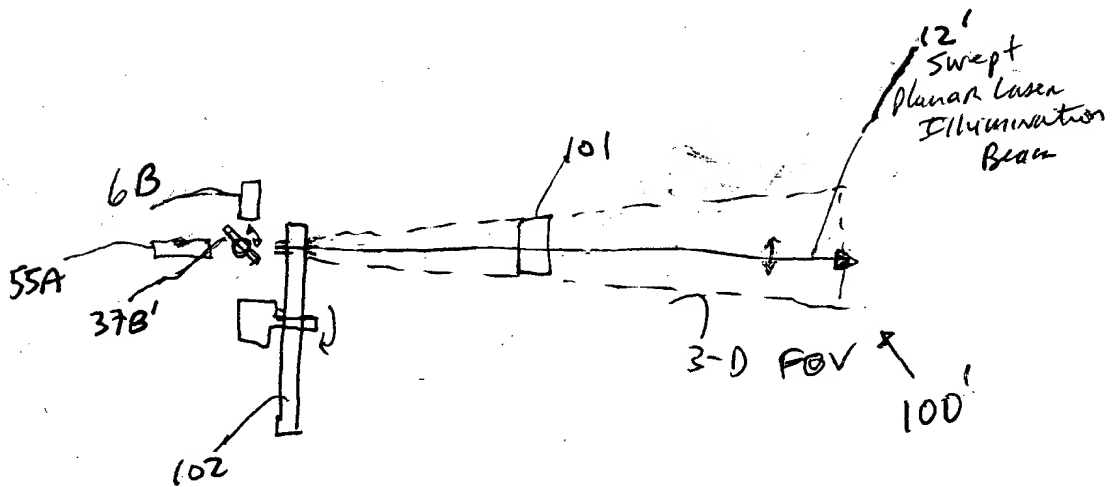


FIG. 8B

FIG. 8A

POST 90 OCT 28 1990

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1-D CCD SCANNER EMBODIMENT

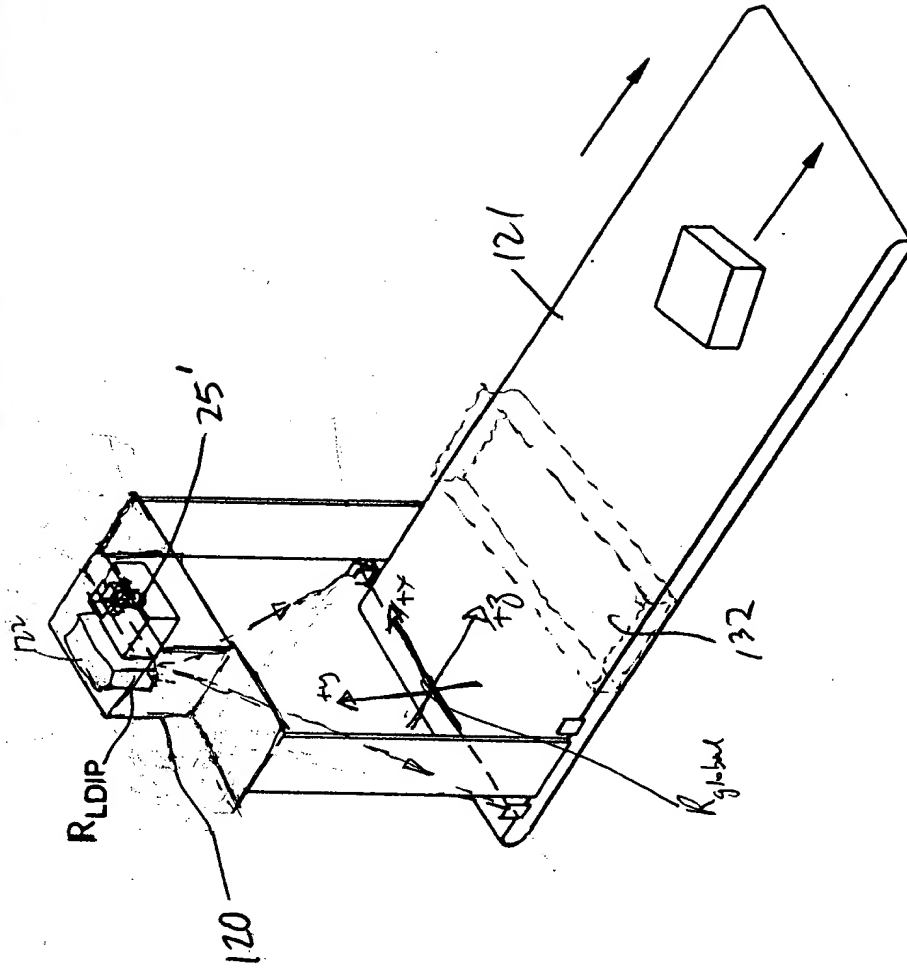


FIG. 9

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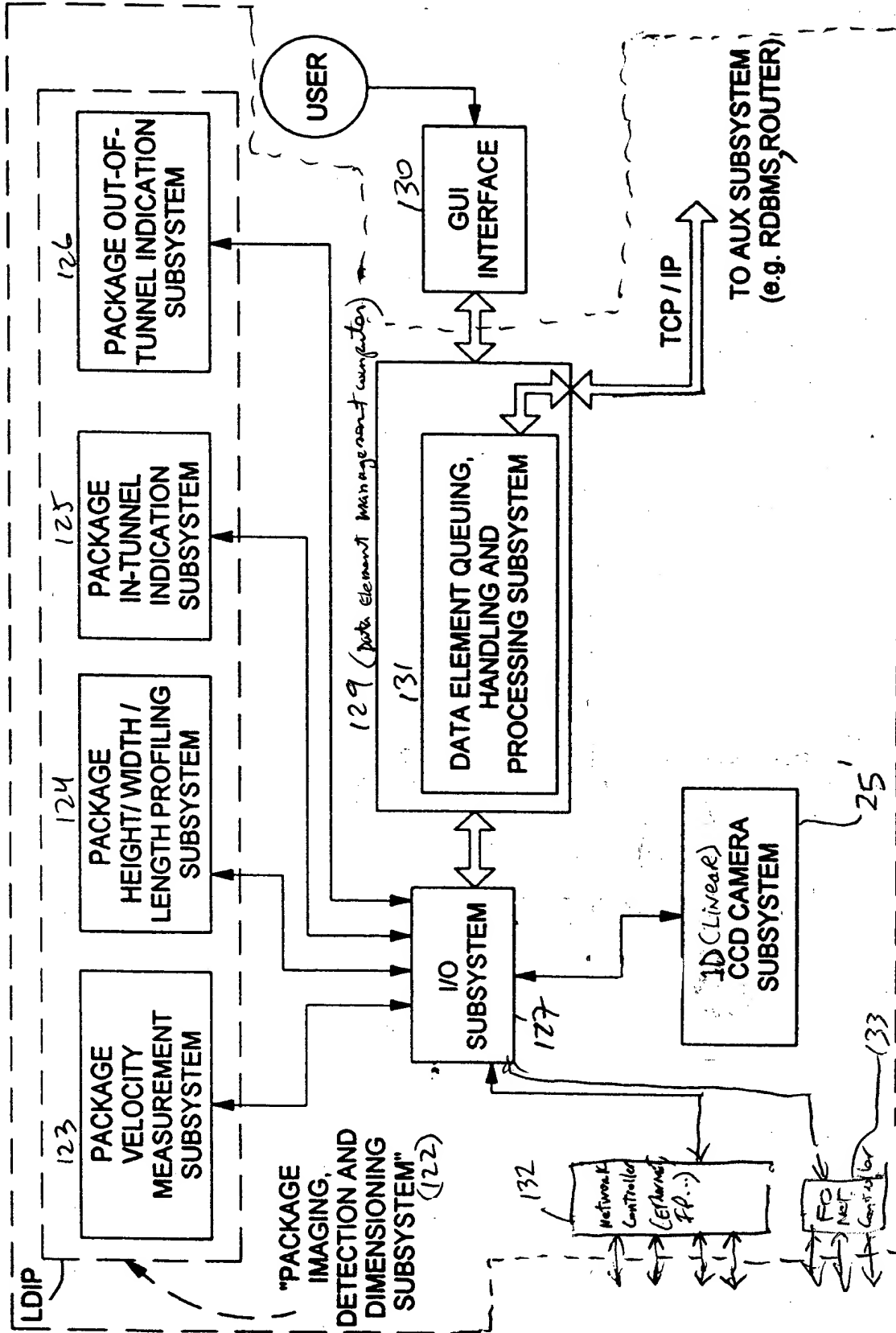


FIG. 10

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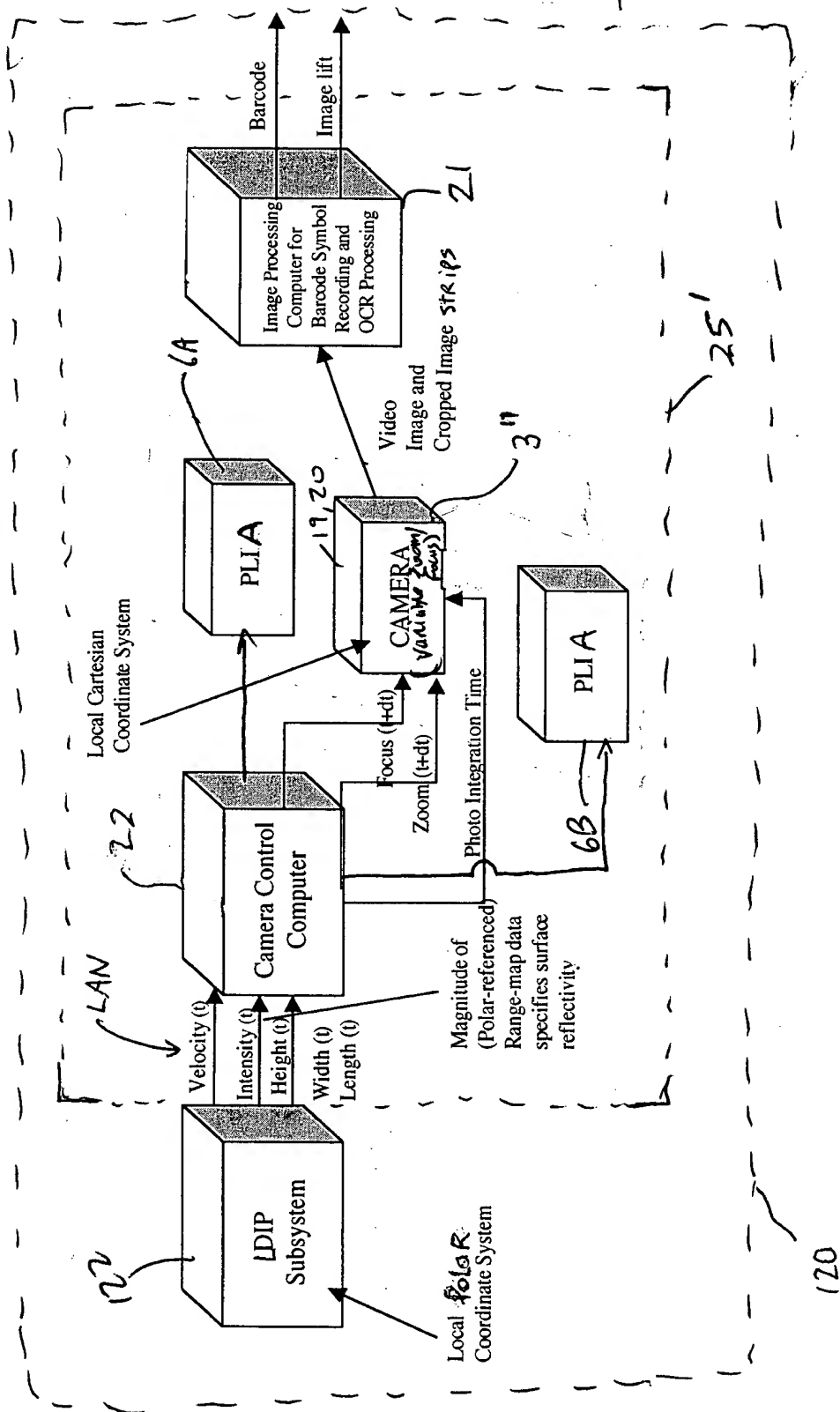


FIG. 11



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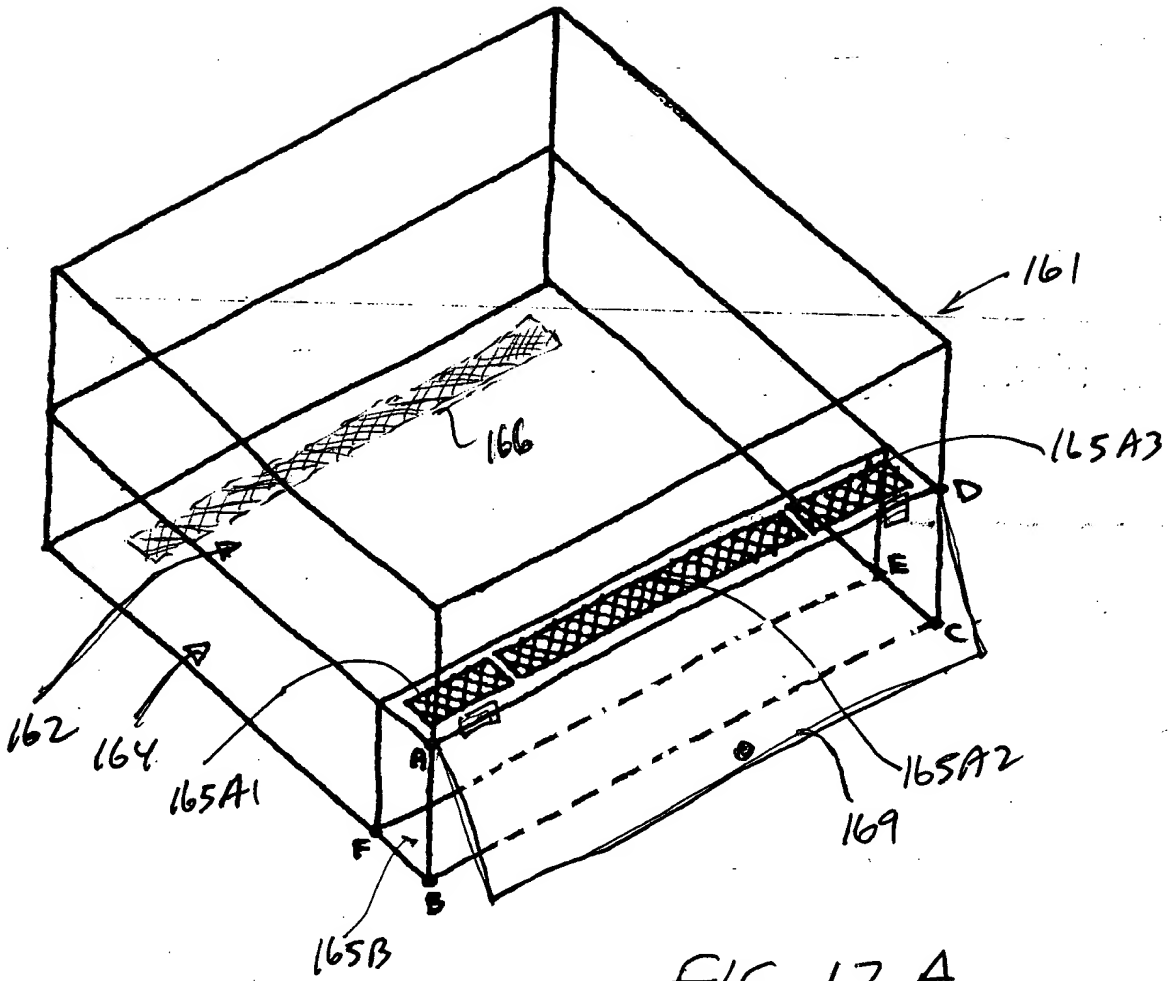


FIG. 12A

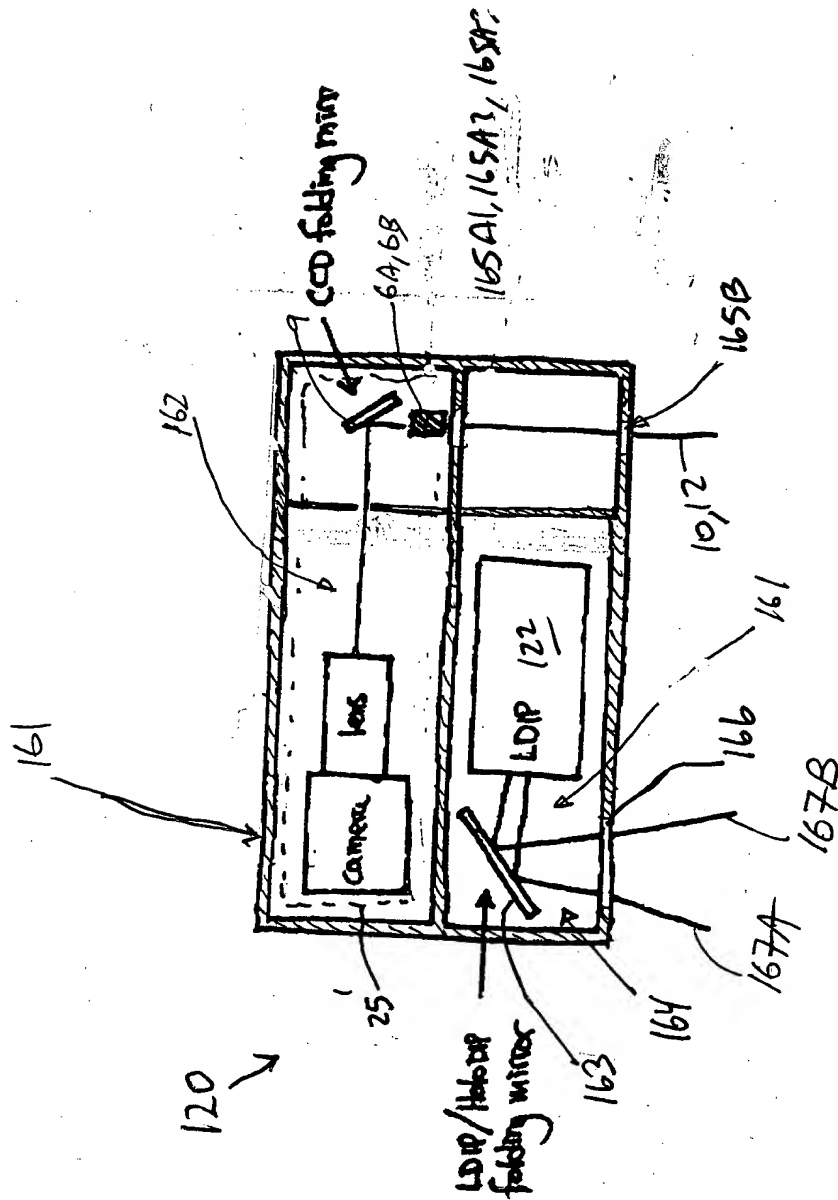


FIG. 12B

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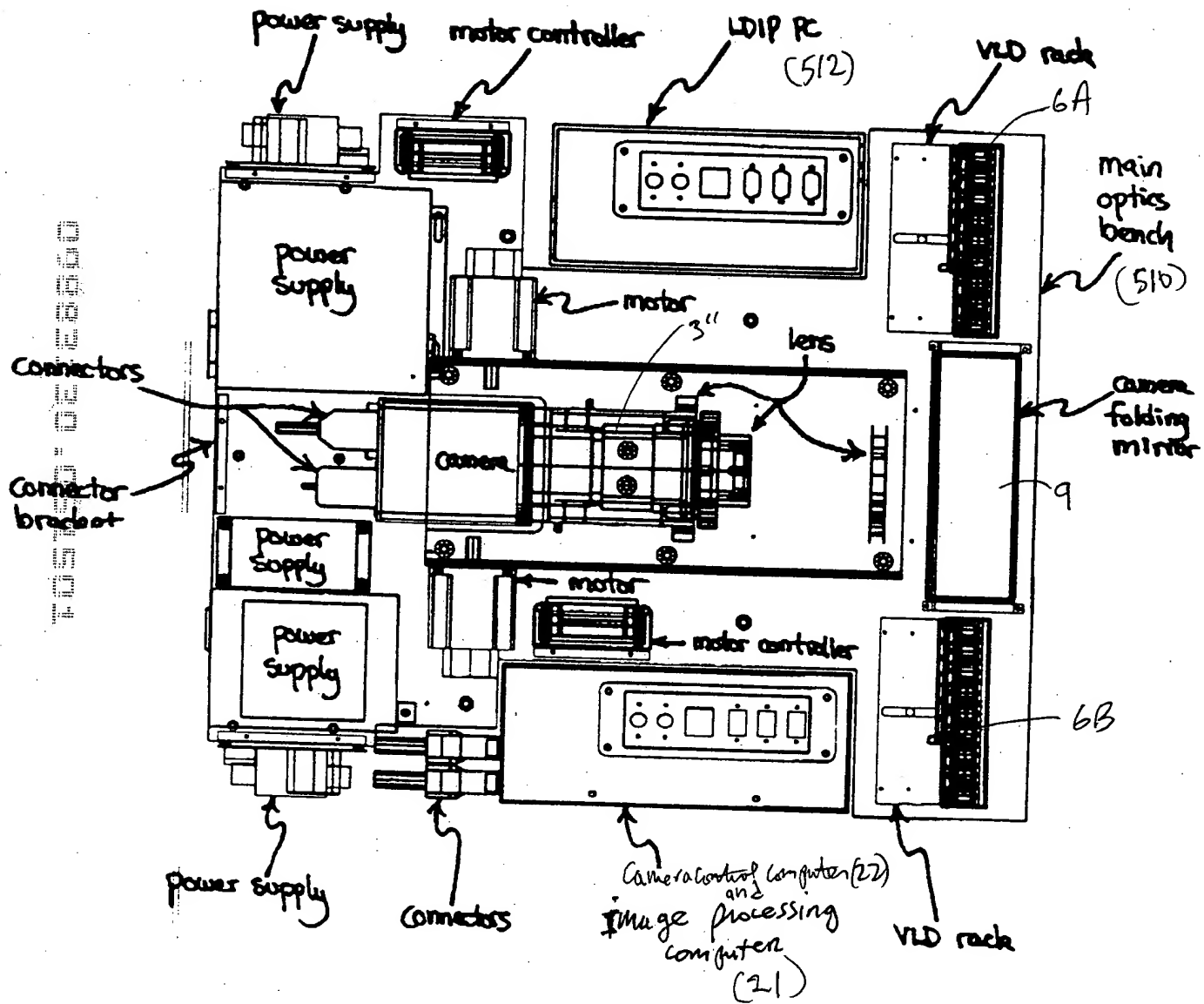


FIG. 12C

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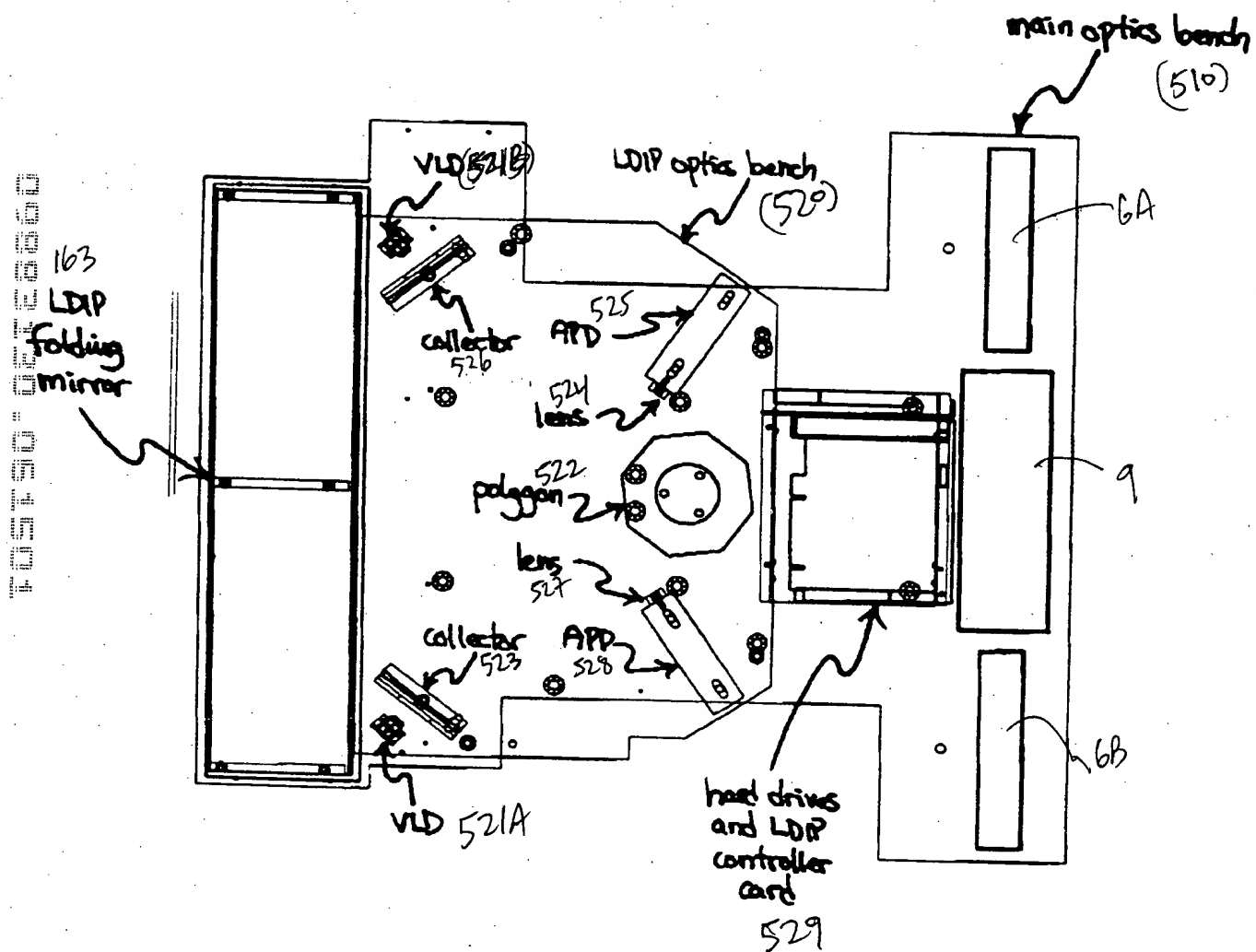
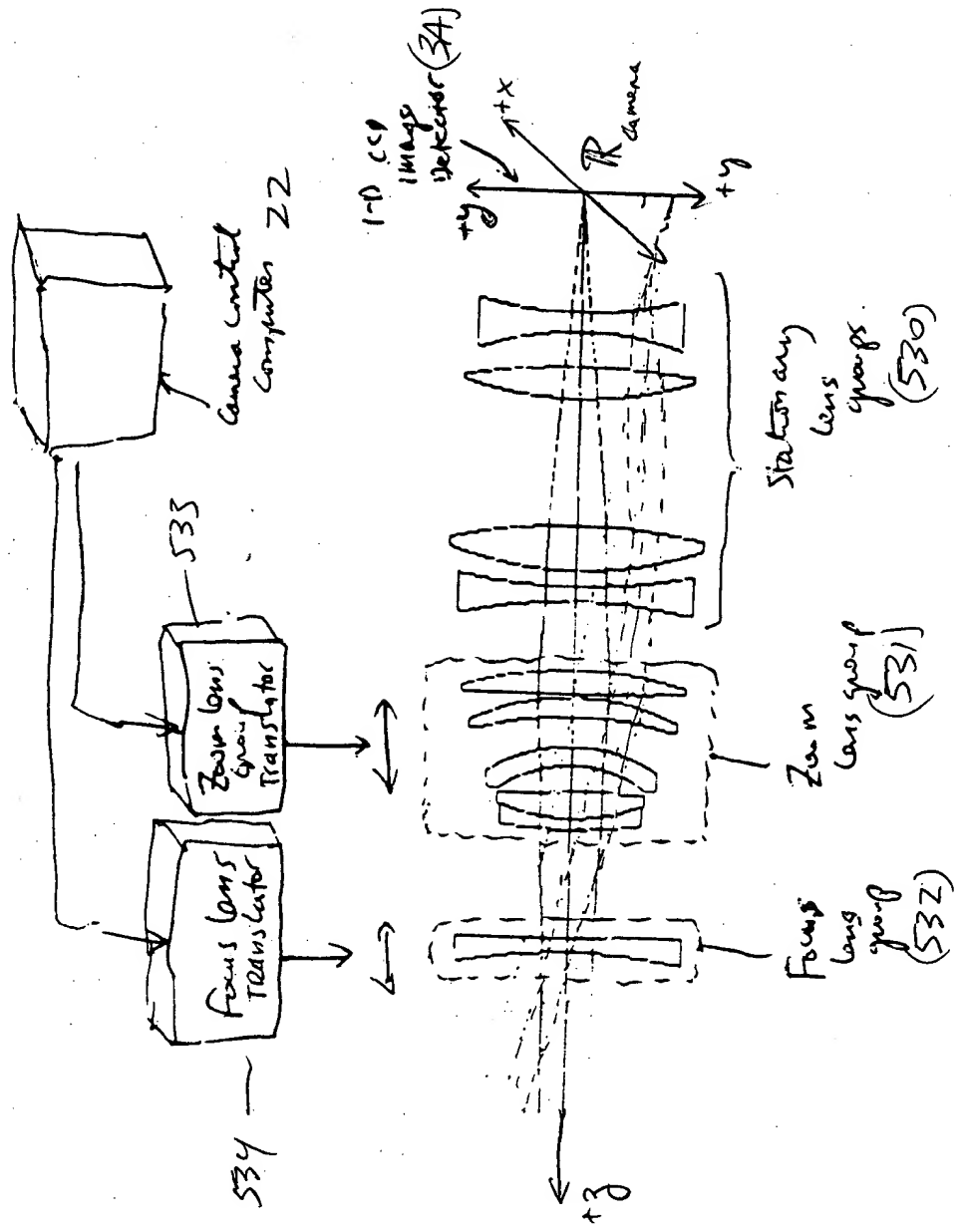


FIG. 12D

FOOTNOTES

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(main optics)  
(Lens groups)

FIG. 12E

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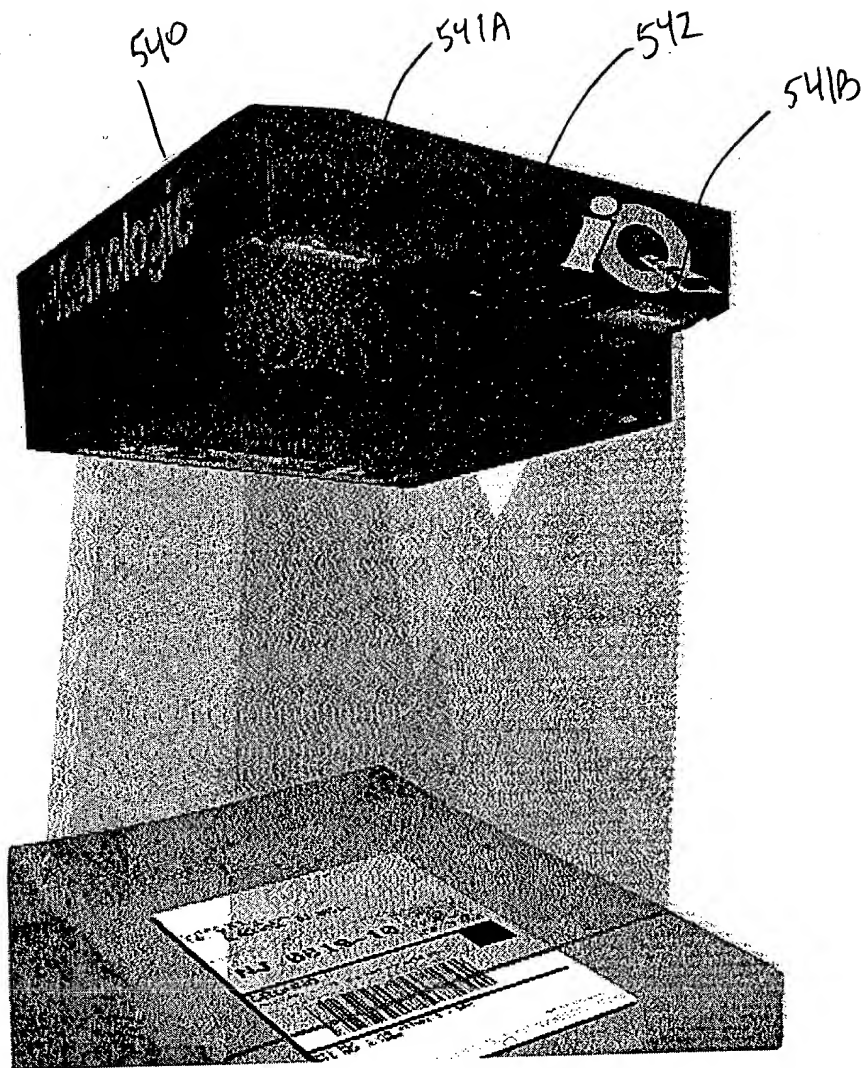


FIG. 13A

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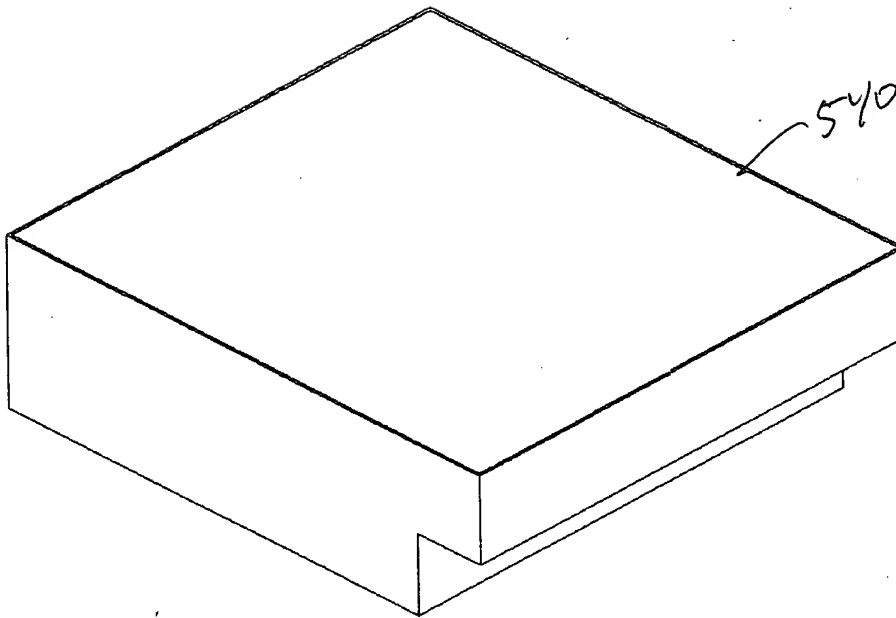


FIG. 13B

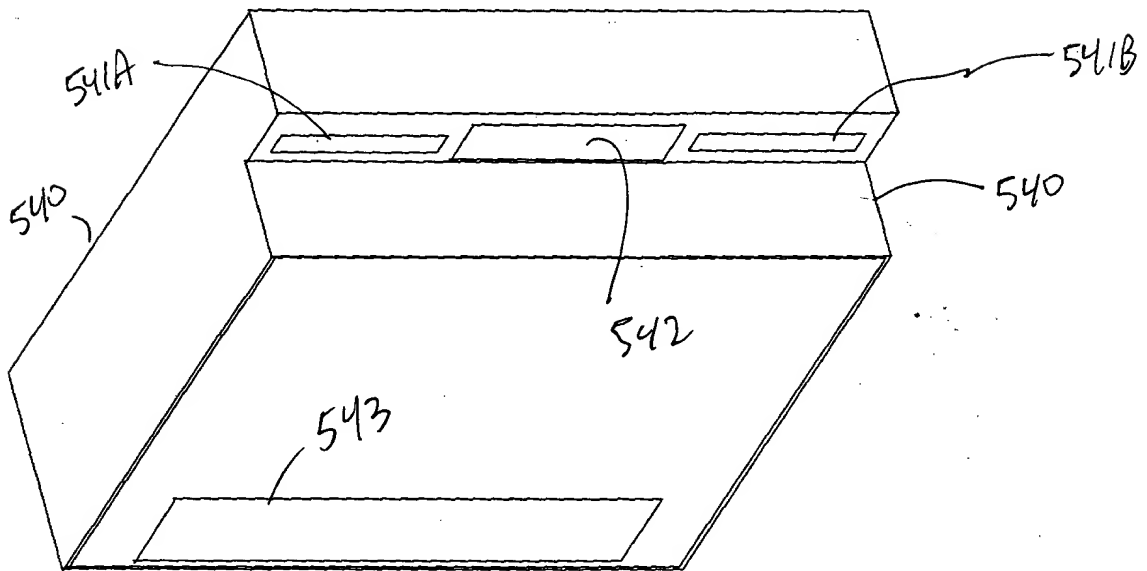


FIG. 13C

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# PLLIM-BASED PACKAGE IDENTIFICATION AND DIMENSIONING (PID) SYSTEM

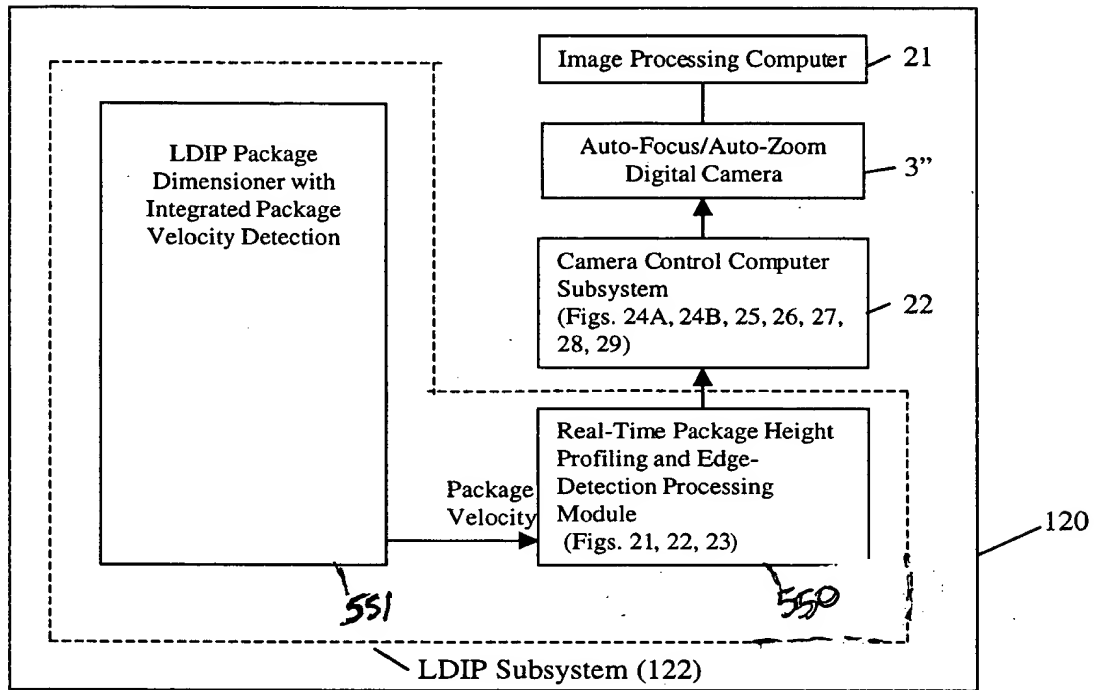


FIG. 14



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# LDIP REAL-TIME PACKAGE HEIGHT PROFILE AND EDGE DETECTION METHOD

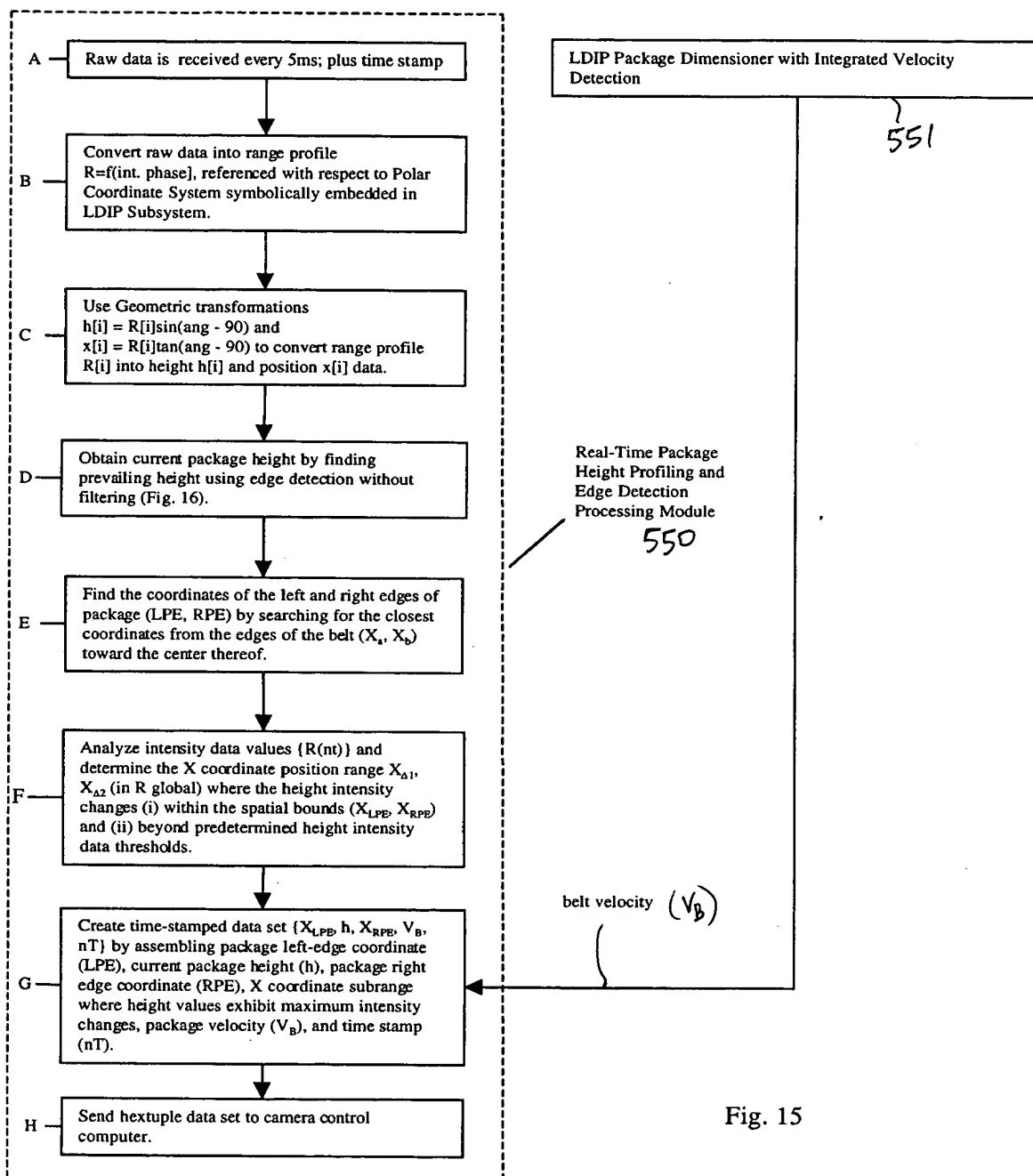
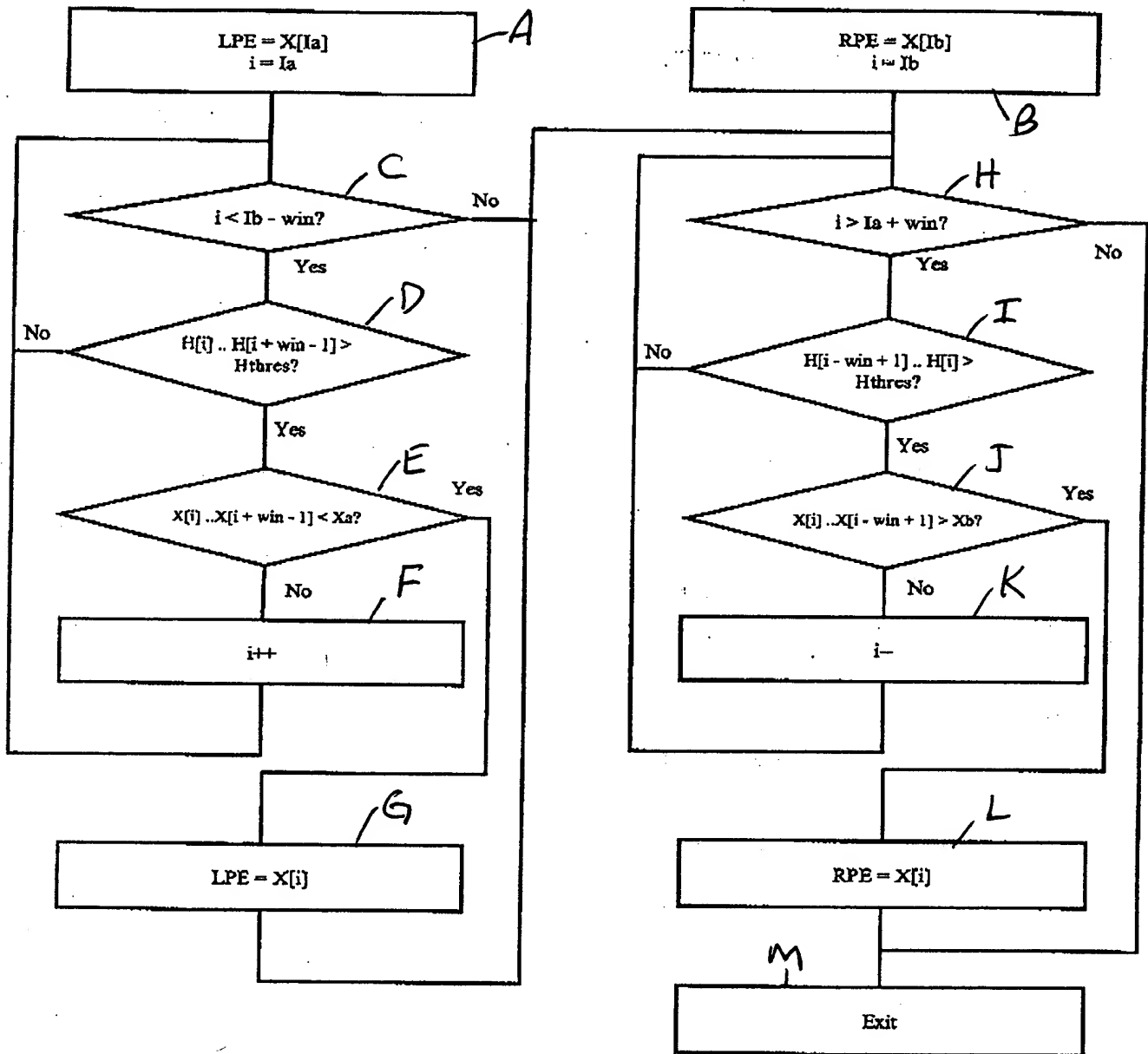


Fig. 15

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# LDIP Real Time Package Edge Detection



$Xa$  = location of belt left edge;  $Xb$  = location of belt right edge  
 $Ia$  = belt edge edge pixel;  $Ib$  = belt right edge pixel  
 $LPE$  = Left package edge;  $RPE$  = Right package edge  
 $H[]$  = Pixel height array;  $X[]$  = Pixel location array  
 $win$  = package detection window

FIG. 16

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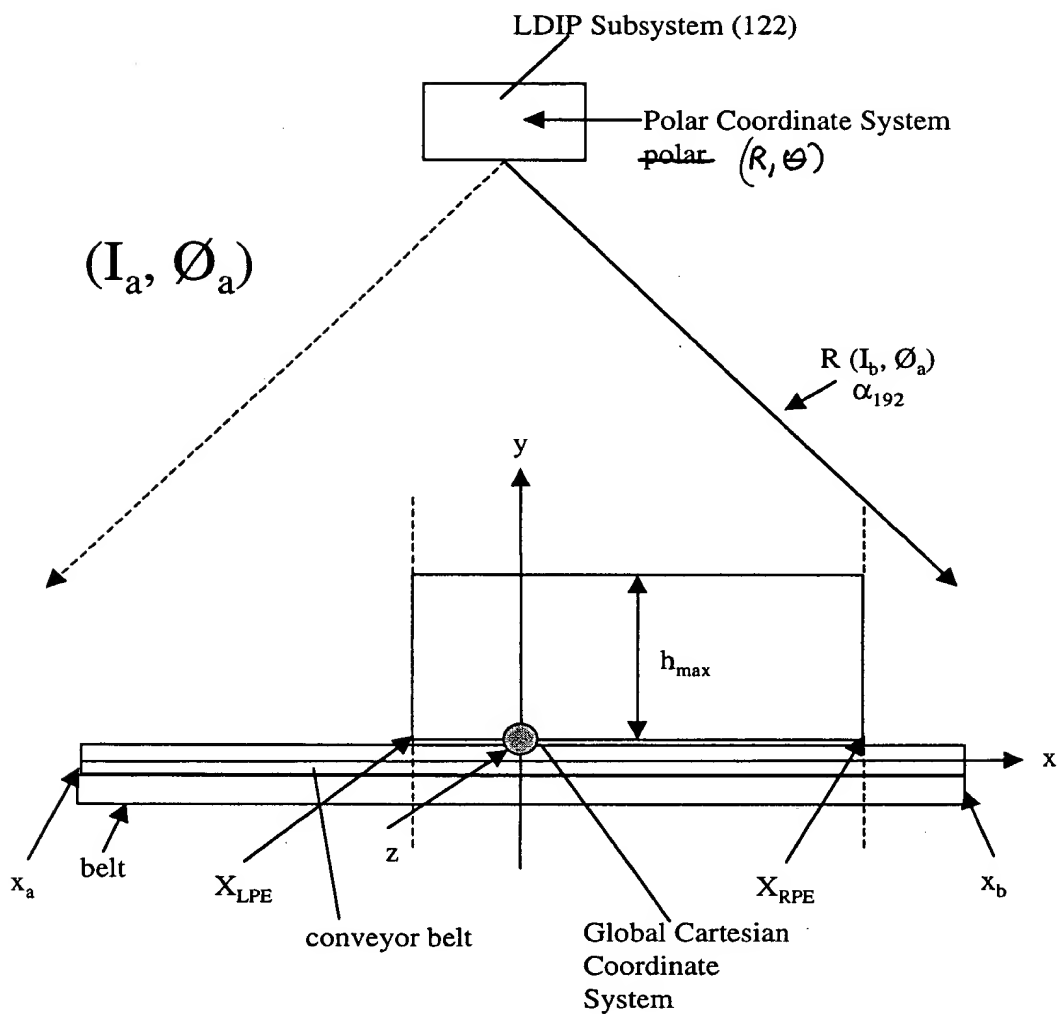


Fig. 17

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# INFORMATION MEASURED AT SCAN ANGLES BEFORE COORDINATE TRANSFORMS

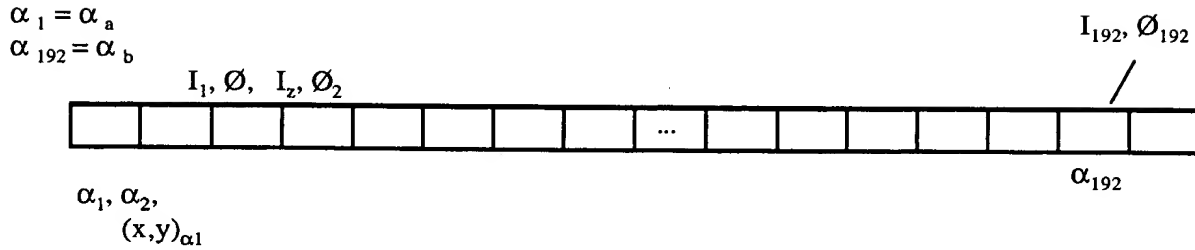


Fig. 17A

## RANGE AND POLAR ANGLE MEASURES TAKEN AT SCAN ANGLE $\alpha$ BEFORE COORDINATE TRANSFORMS

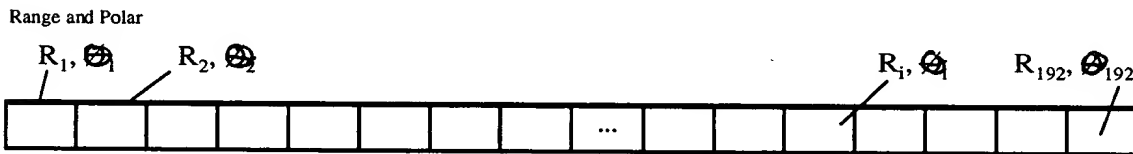


Fig. 17B

## MEASURED PACKAGE HEIGHT AND POSITION VALUES AFTER COORDINATE TRANSFORMS

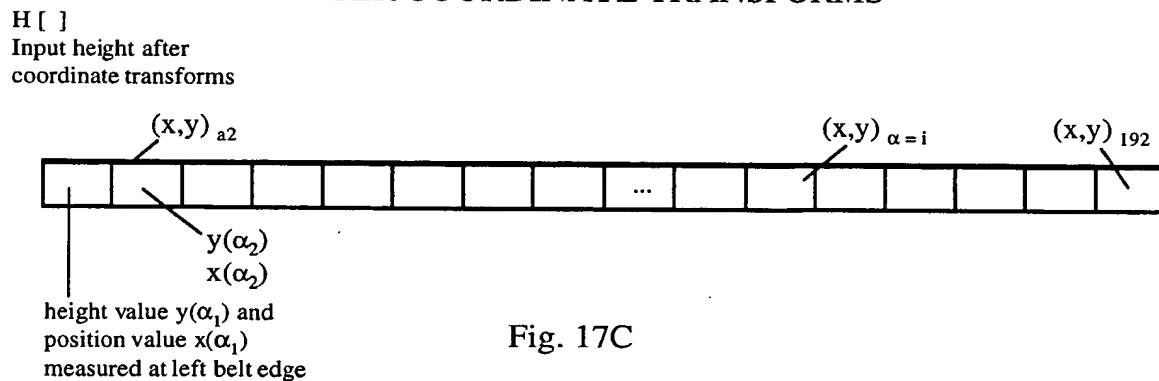


Fig. 17C

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# CAMERA CONTROL PROCESS CARRIED OUT WITHIN THE CAMERA CONTROL SUBSYSTEM OF EACH OBJECT ATTRIBUTE ACQUISITION AND ANALYSIS SYSTEM

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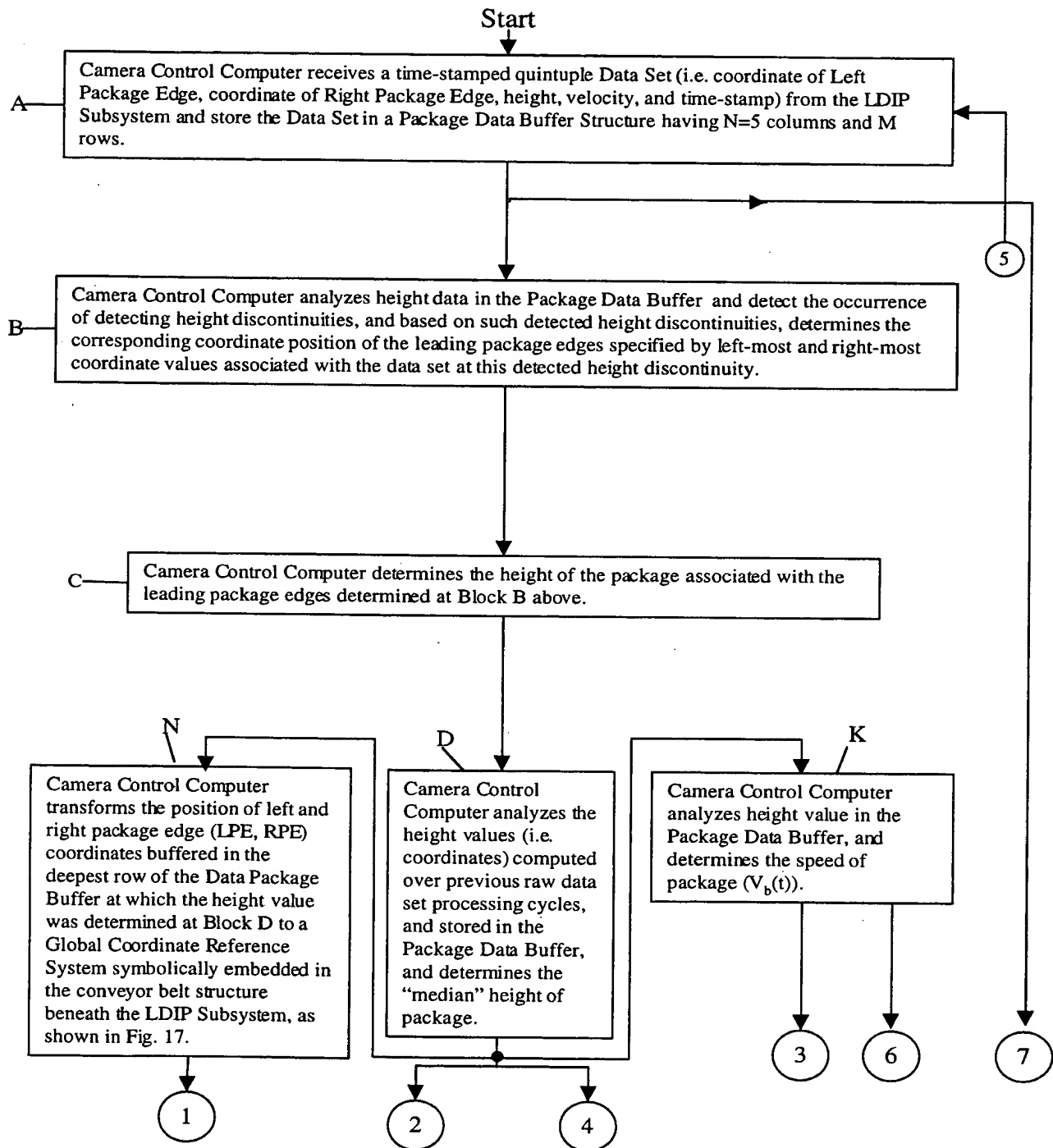


Fig. 18A

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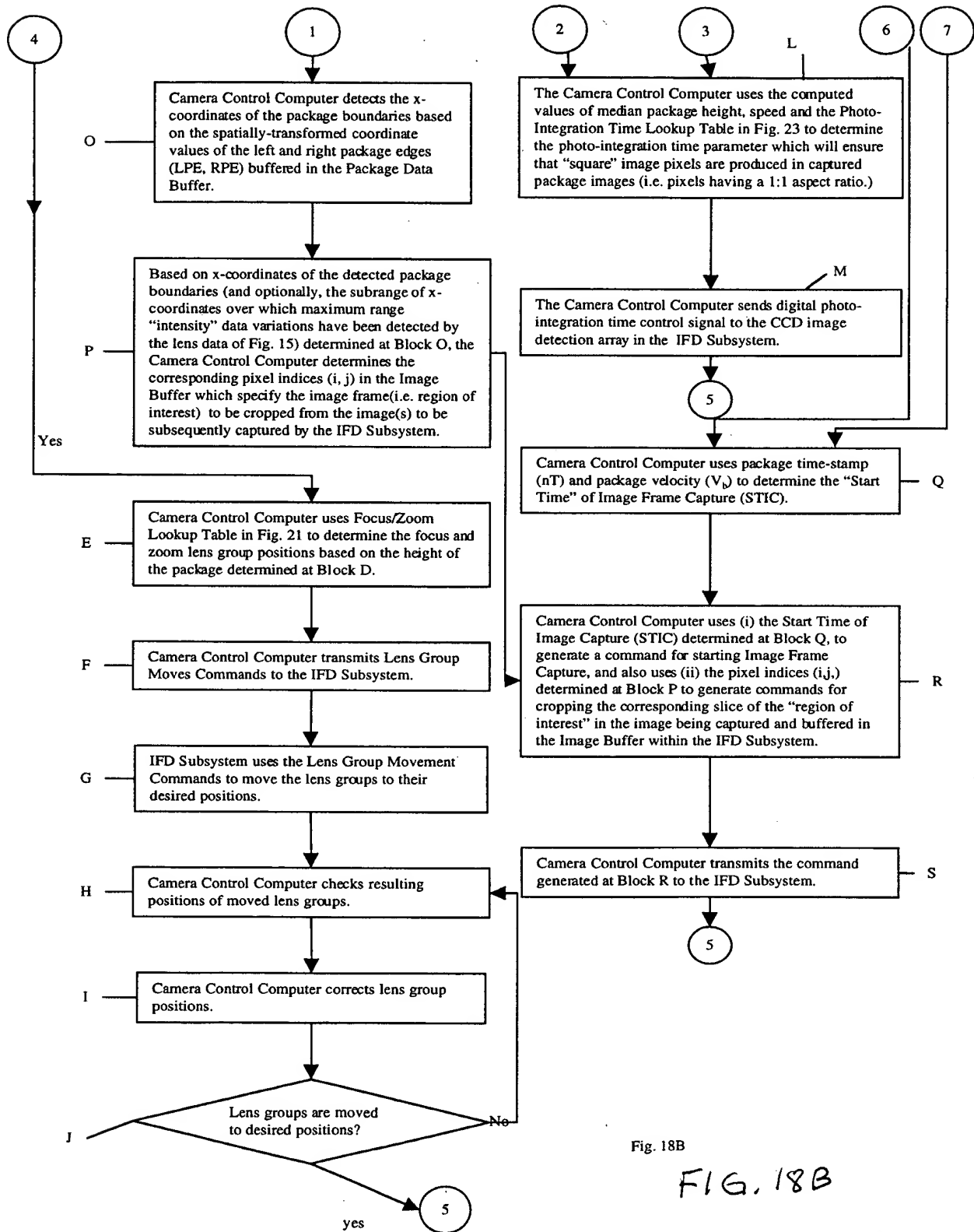


Fig. 18B

FIG. 18B

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x coordinate subrange where maximum range "intensity" variations have been detected

Left Package Edge (LDE)	Package Height (h)	Right Package Edge (RPE)	Package Velocity	Time-stamp (nT)	
					Row 1
					Row 2
					Row 3
					Row 4
					Row 5
					Row M

Package Data Buffer (FIFO)

Fig. 19

																				Columns →	
																					Rows ↓

Camera Pixel Data Buffer  
pixel indices (i,j)

Fig. 20

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Zoom and Focus Lens Group Position  
Look-up Table

Distance from Camera H (mm)	Zoom group distance (mm) Y (Zoom)	Focus group distance (mm) Y (Focus)
1000	21.57489228	2.47E-05
1100	19.38089696	10.99009783
1200	17.10673434	20.65783177
1300	14.77137314	29.10917002
1400	12.39153565	36.47312595
1500	9.979114358	42.87845436
1600	7.540639114	48.44003358
1700	5.078794775	53.25495831
1800	2.595989366	57.40834303
1900	0.099972739	60.98883615

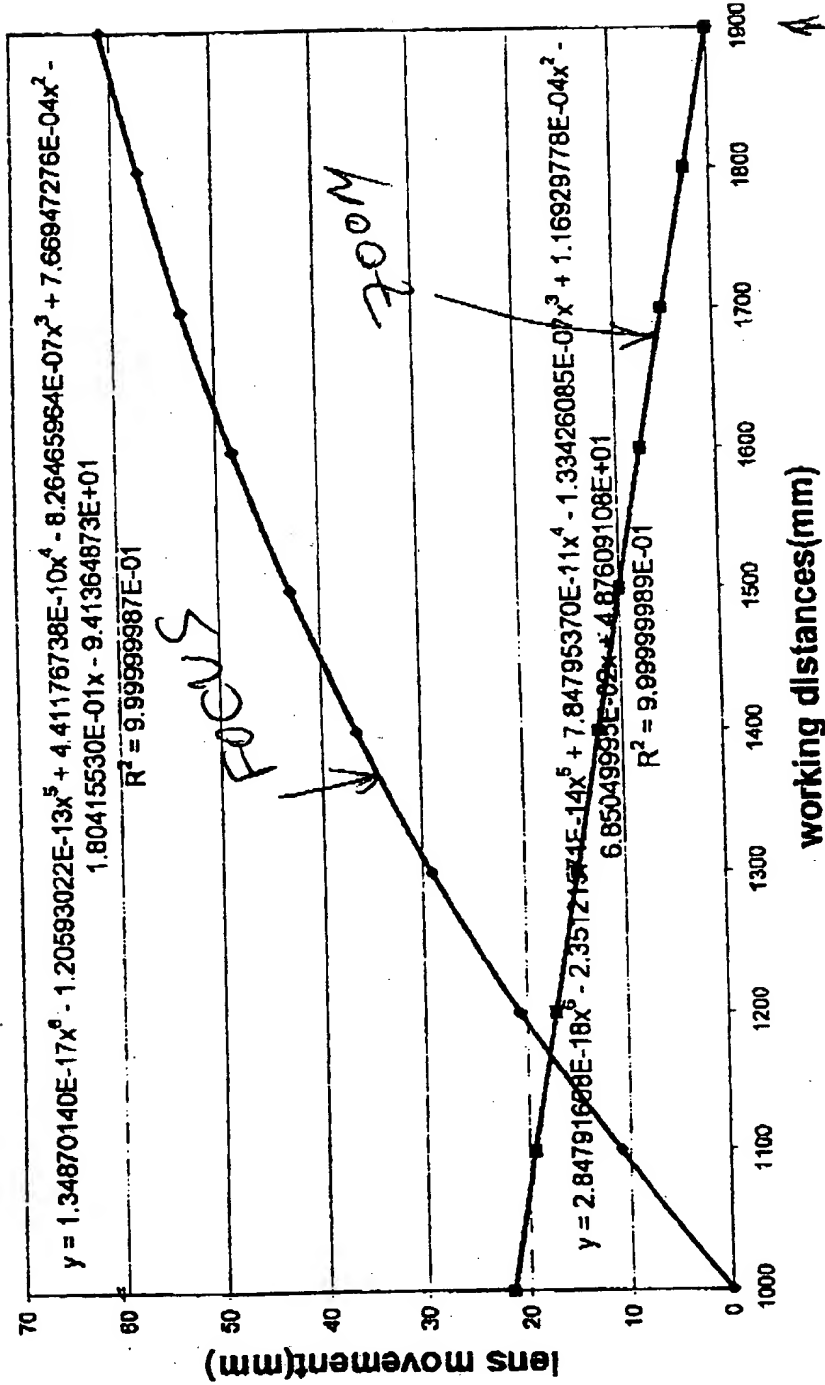
(use  
interpolation  
techniques  
for walking  
distances  
between listed  
points in  
table)

FIG. 21



\* Note: The focal distance & zoom (eff. focal length) of camera lens are coupled (interdependent) in camera has a fixed aperture F5.6

# Focus and Zoom lens movement vs. working distances

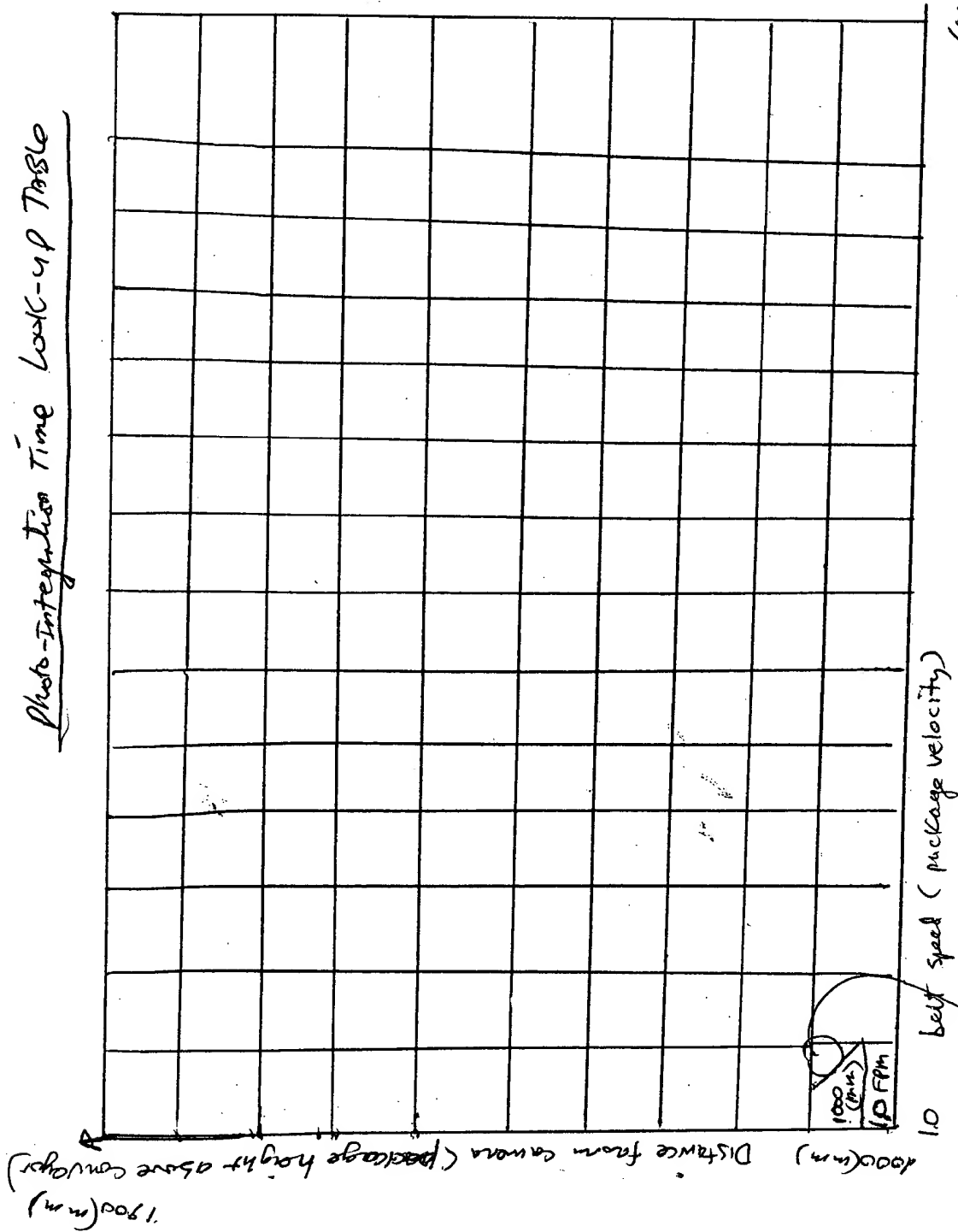


↑ (inches) 11 36 above conveyor belt  
← package height above conveyor  
conveyor-belt surface

FIG. 22

[illegible]

## Photo-Integration Time Look-up Table



600 feet per minute  
(FPM)

Fig. 23

Photo-integration  
time values that  
ensures square image pixels  
(1:1 aspect ratio)

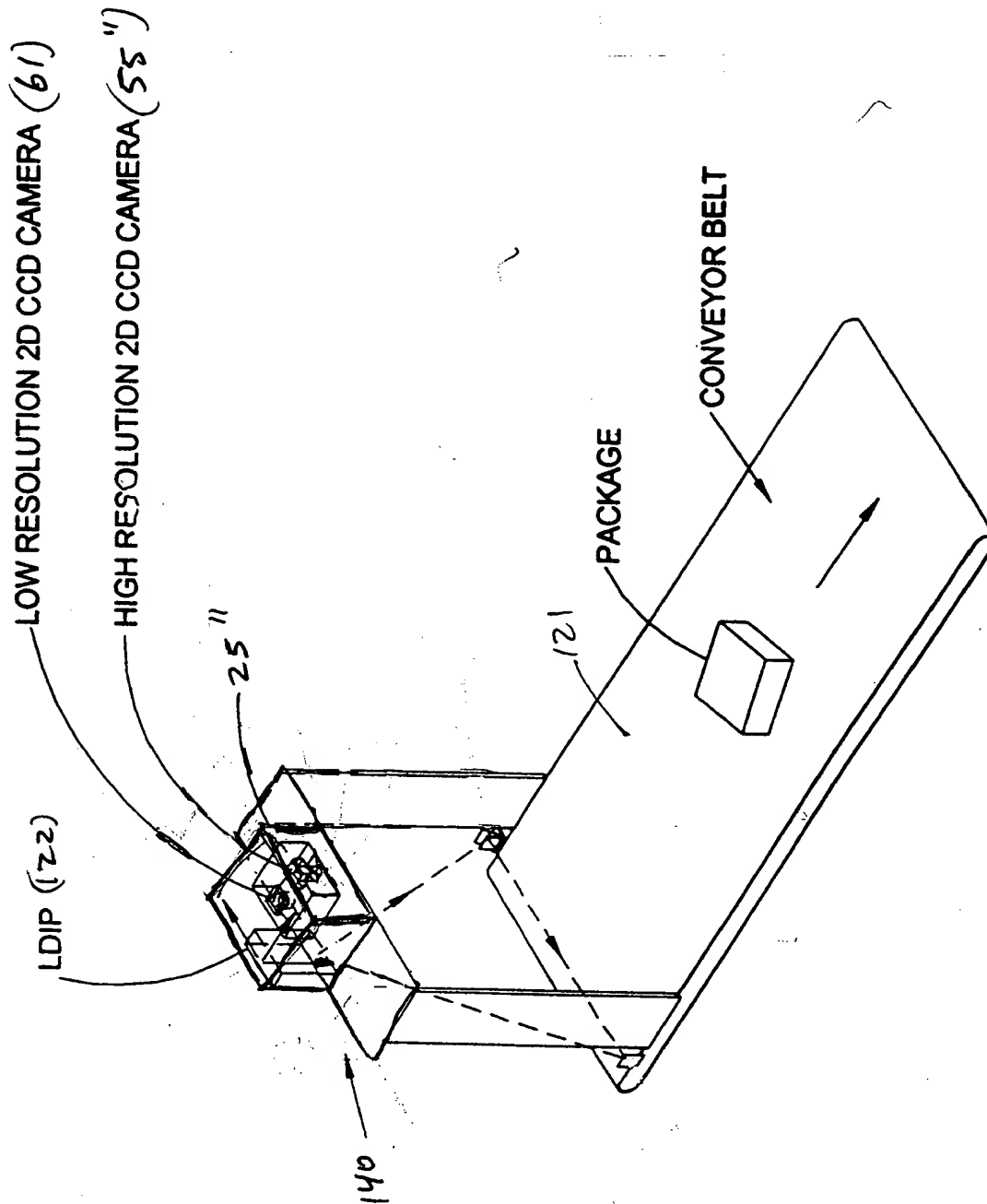


FIG 24



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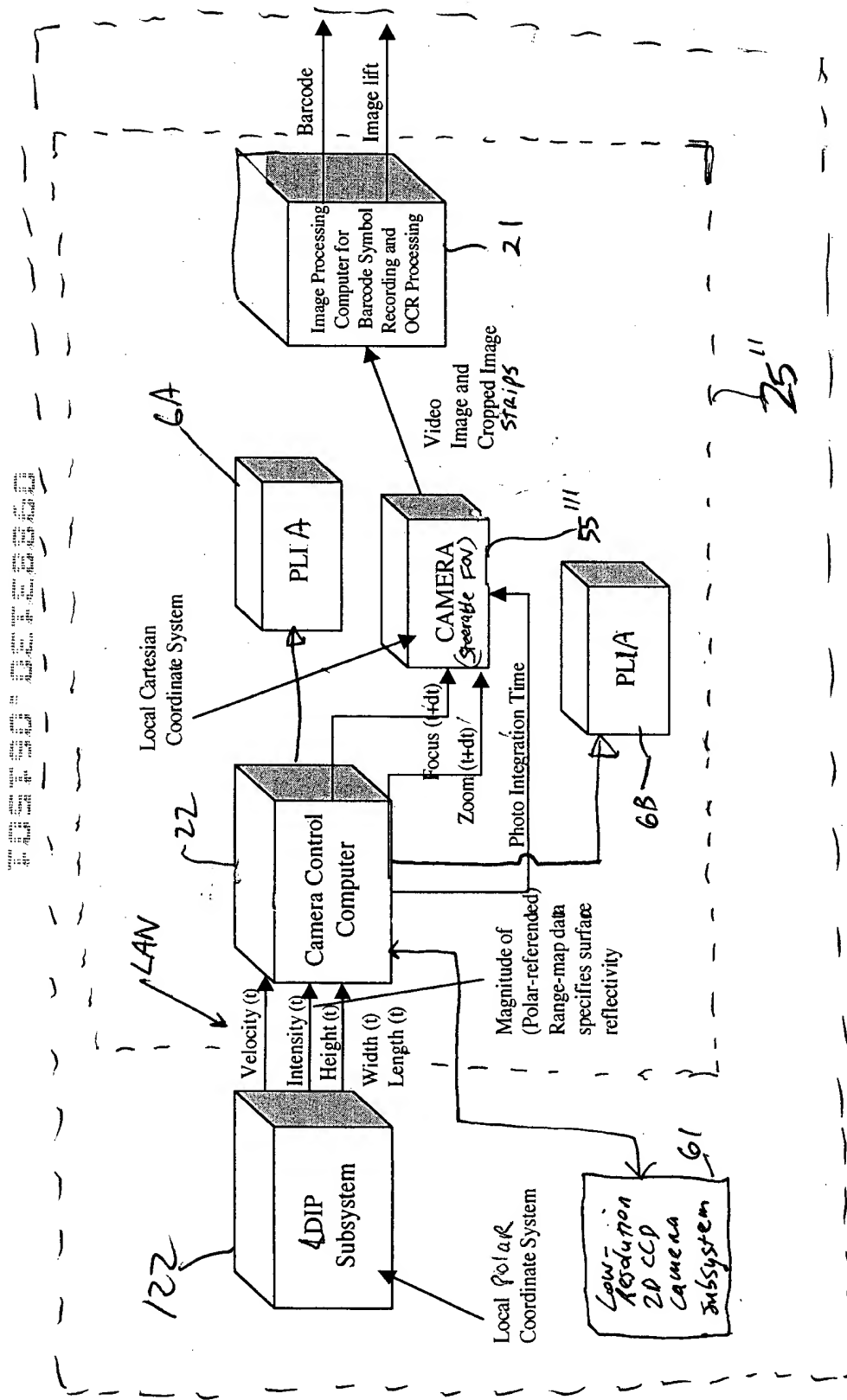


FIG. 26

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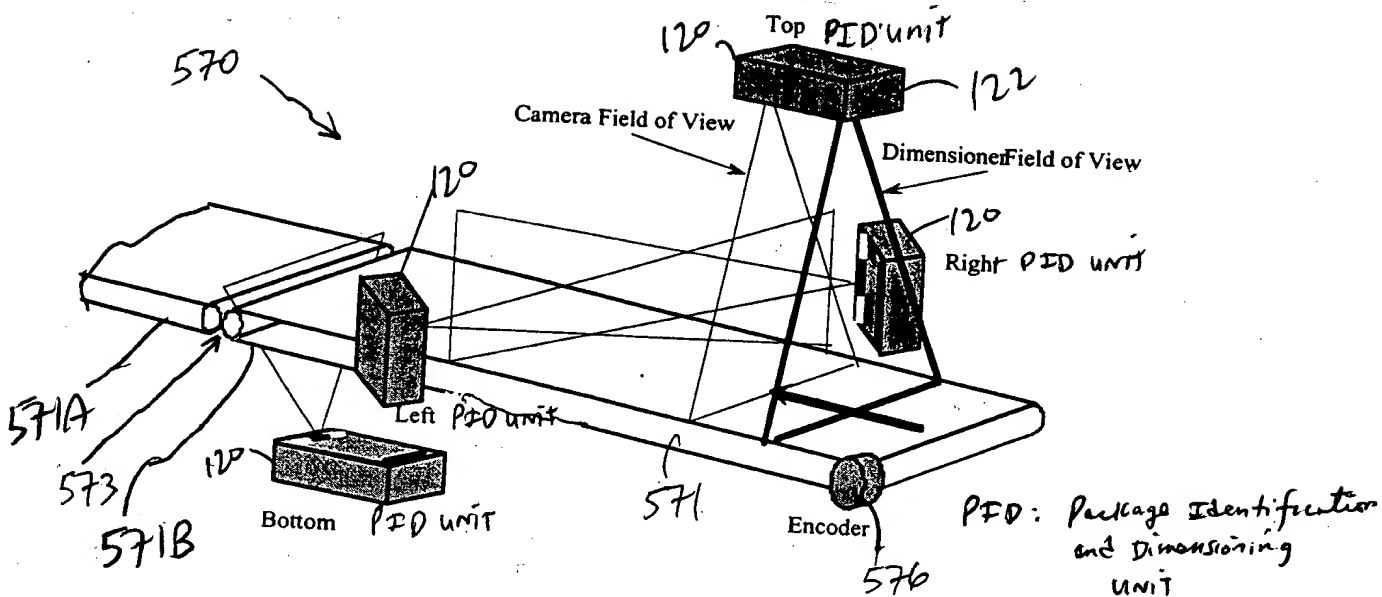


FIG 27

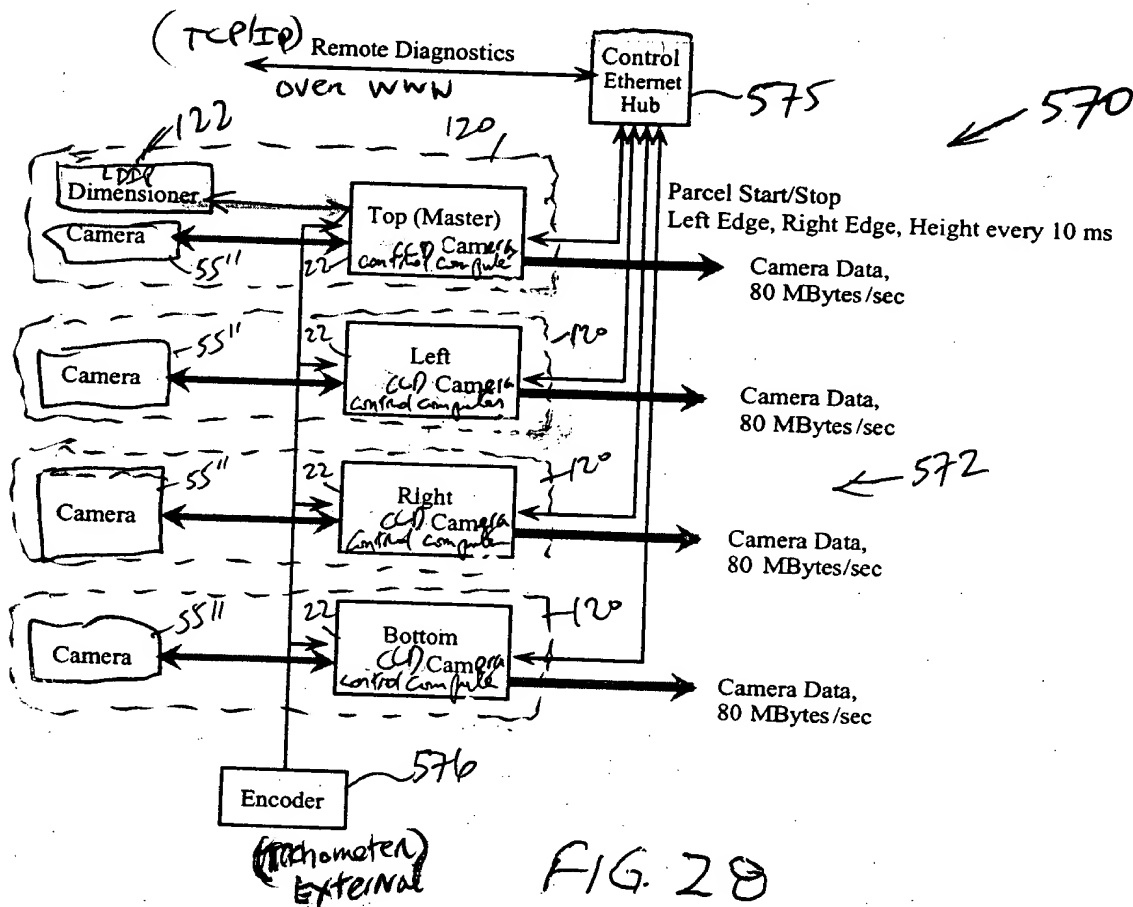


FIG 28

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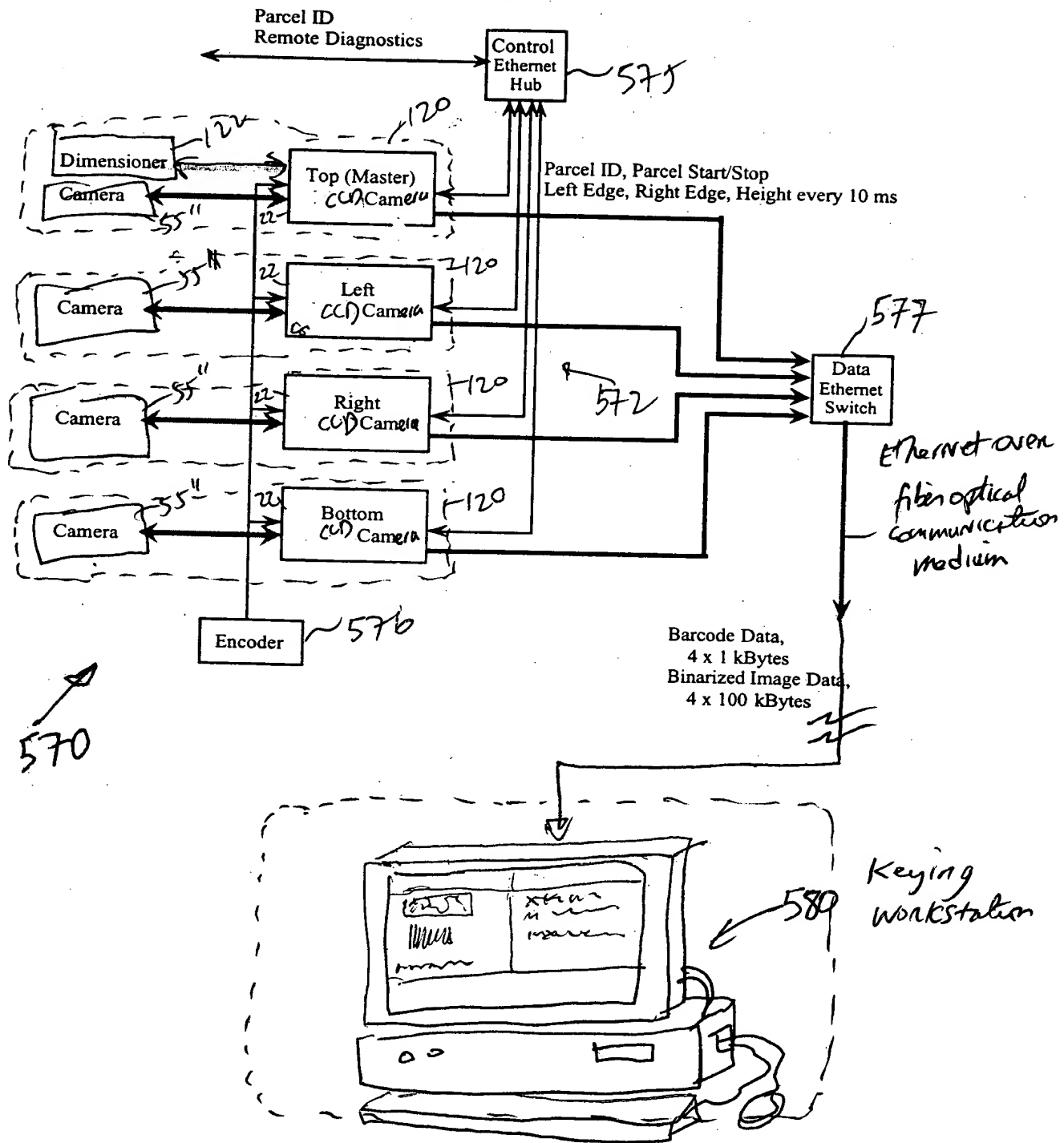


FIG. 29

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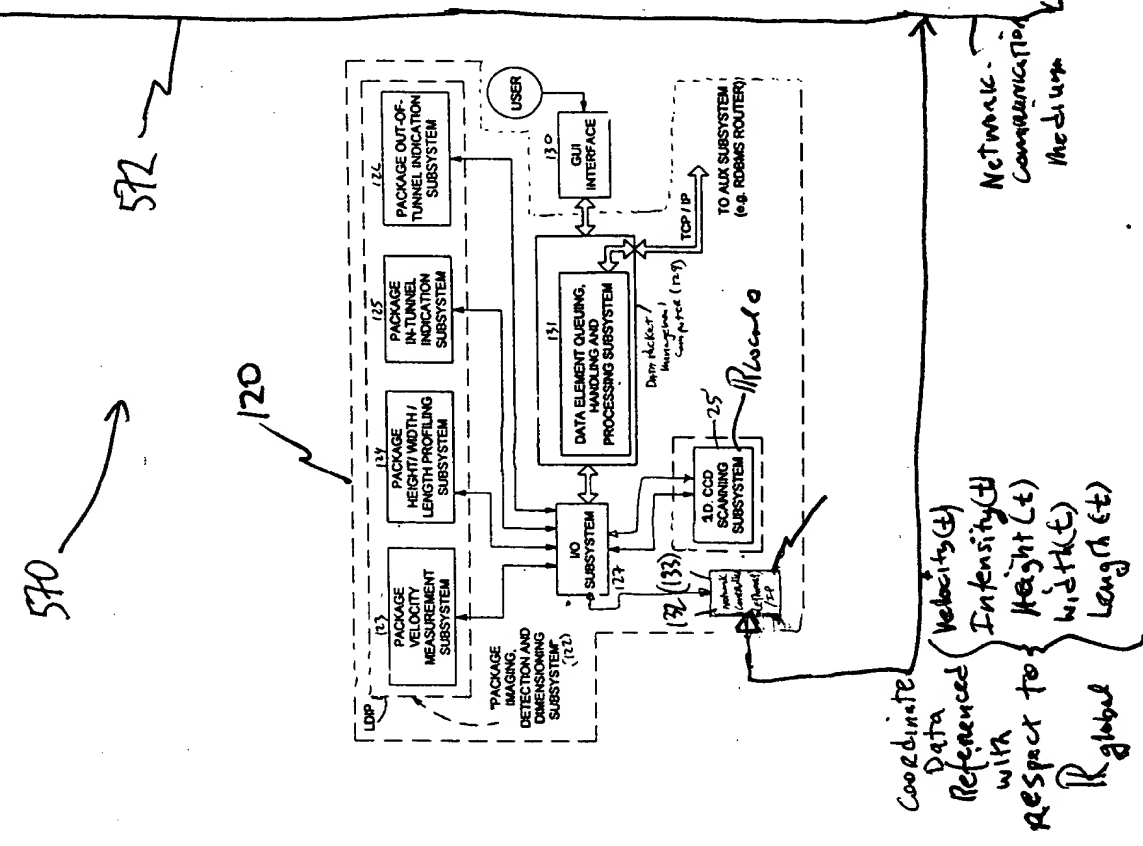
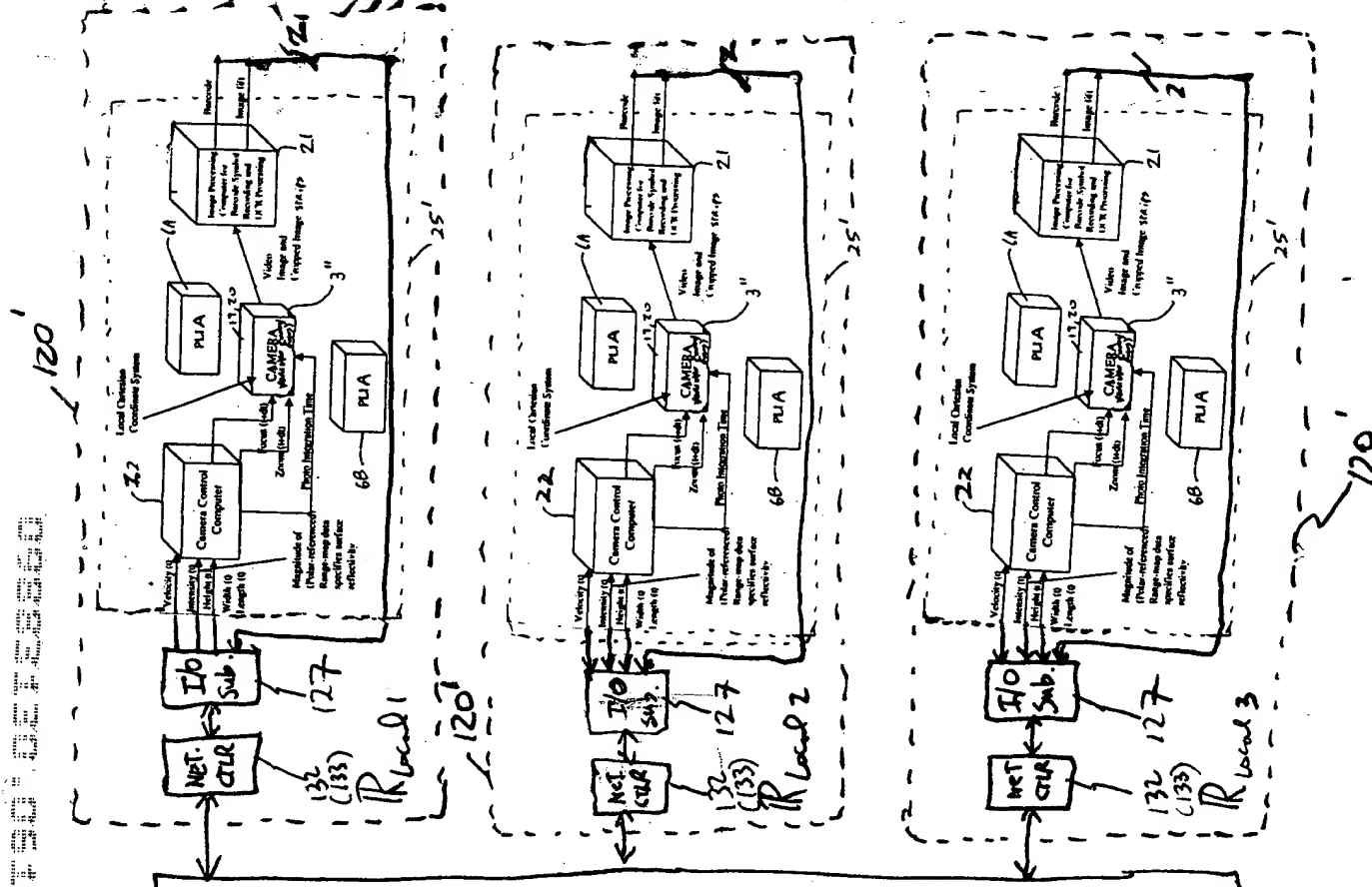
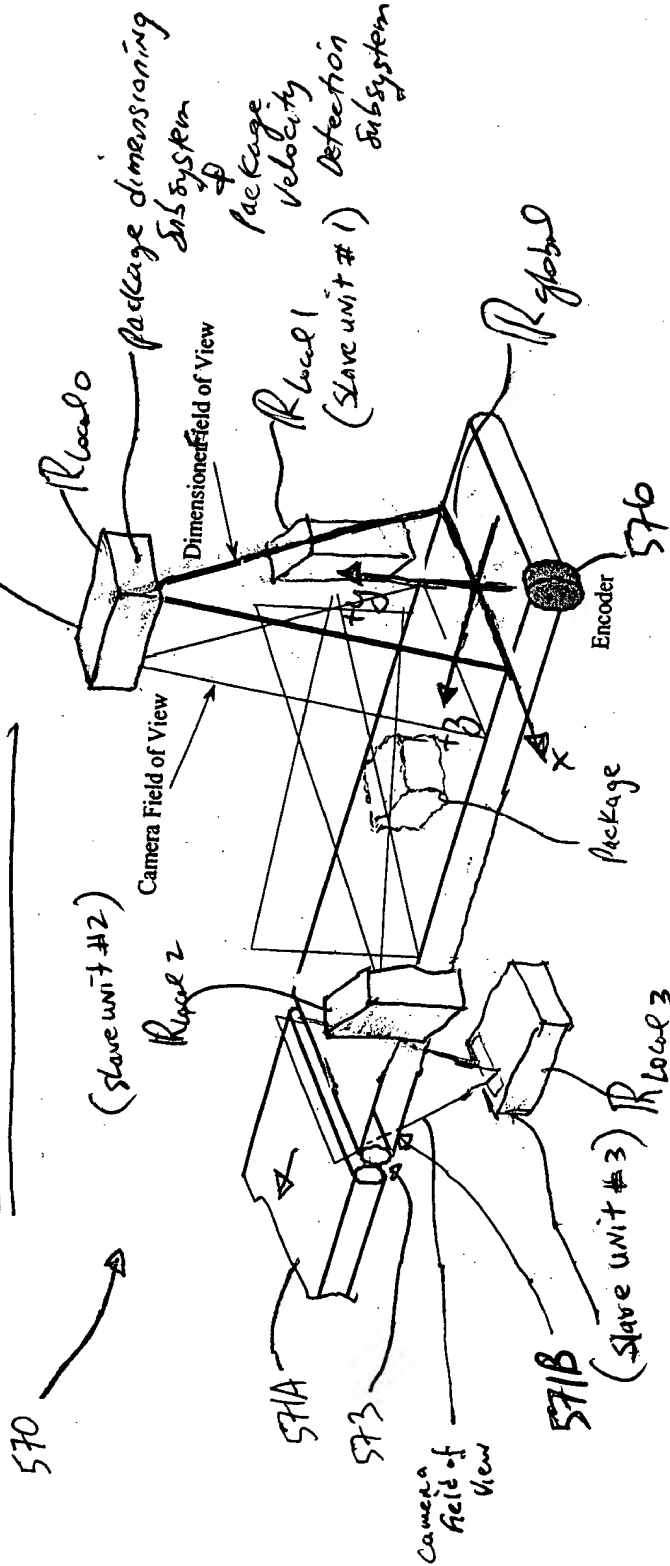


FIG 30



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CCD Camera-Based Tunnel System  
Employing Package Coordinate Data  
Driven Method of Automatic Camera  
Zoom and Focus Control



Package coordinate data  $\parallel$   $R_{local}$   $\Rightarrow$   $R_{global}$   $\Rightarrow$  Package coordinate data  $\parallel$   $R_{local}$

FIG. 31

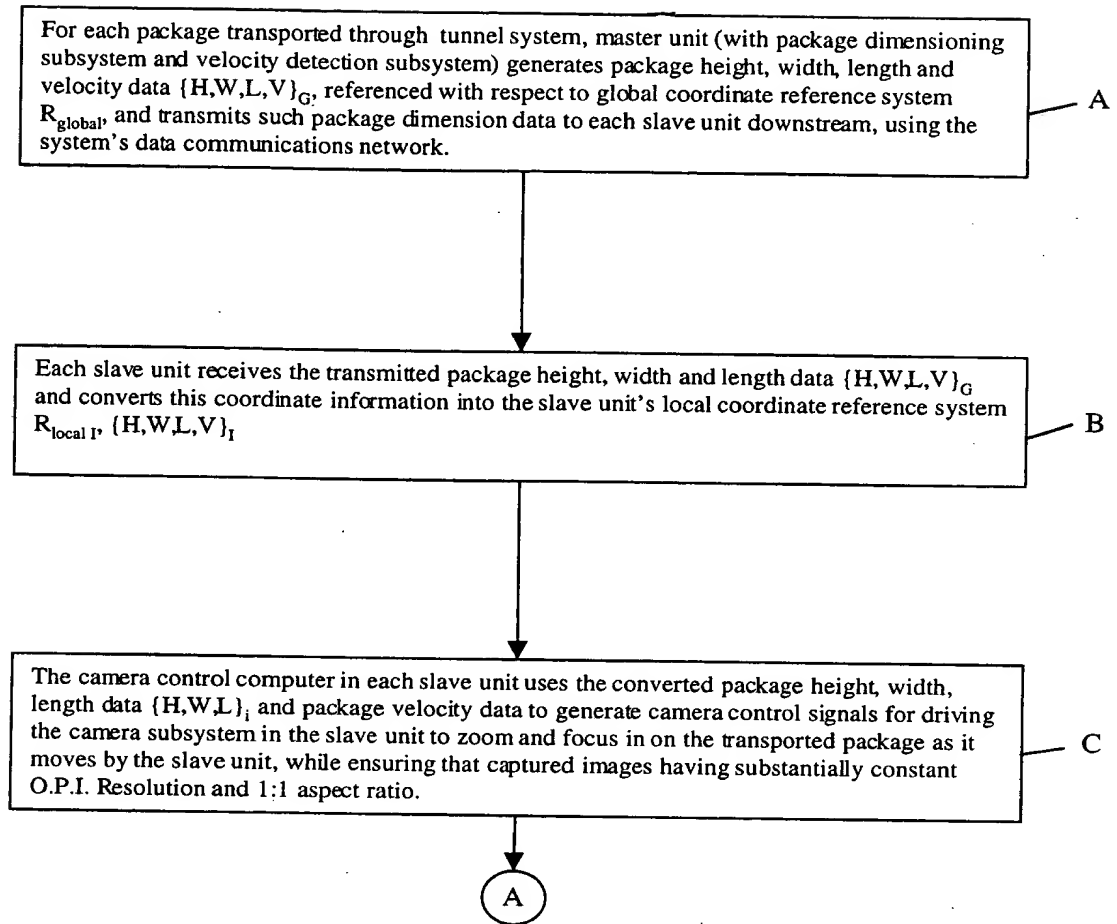


FIG. 32A

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Each slave unit captures images acquired by its intelligently controlled camera subsystem, buffers the same, and processes the images to decode bar code symbol identifiers represented in said images, and/or to perform optical character recognition (OCR) thereupon.

D

The slave unit which decodes a bar code symbol in a processed image automatically transmits a package identification data element (containing symbol character data representative of the decoded bar code symbol) to the master unit (or other designated system control unit employing data element management functionalities) for package data element processing.

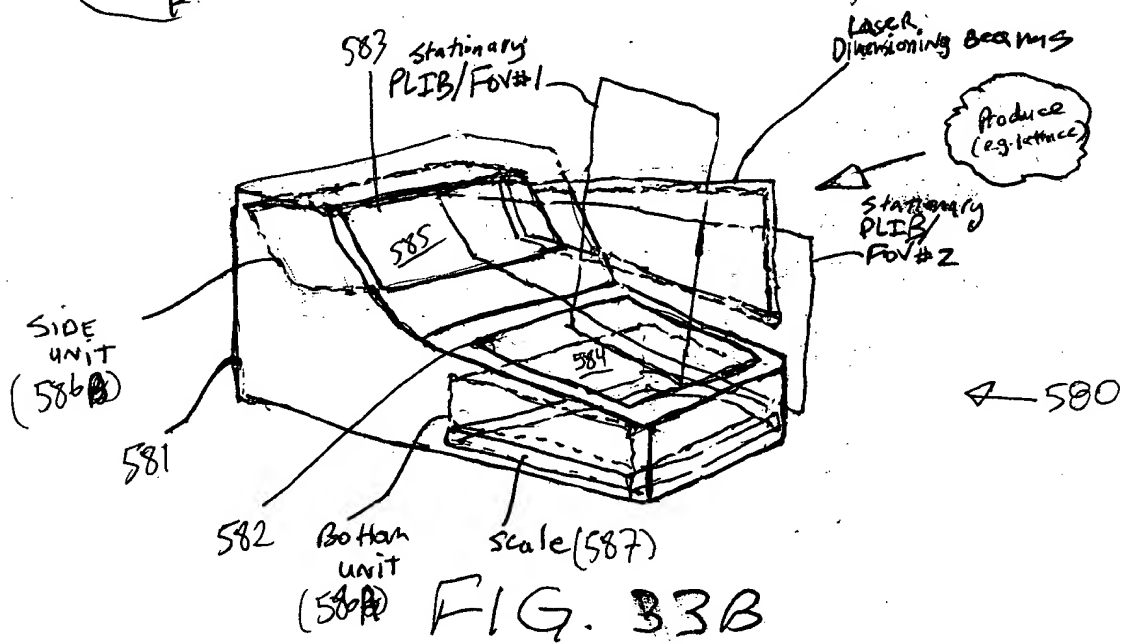
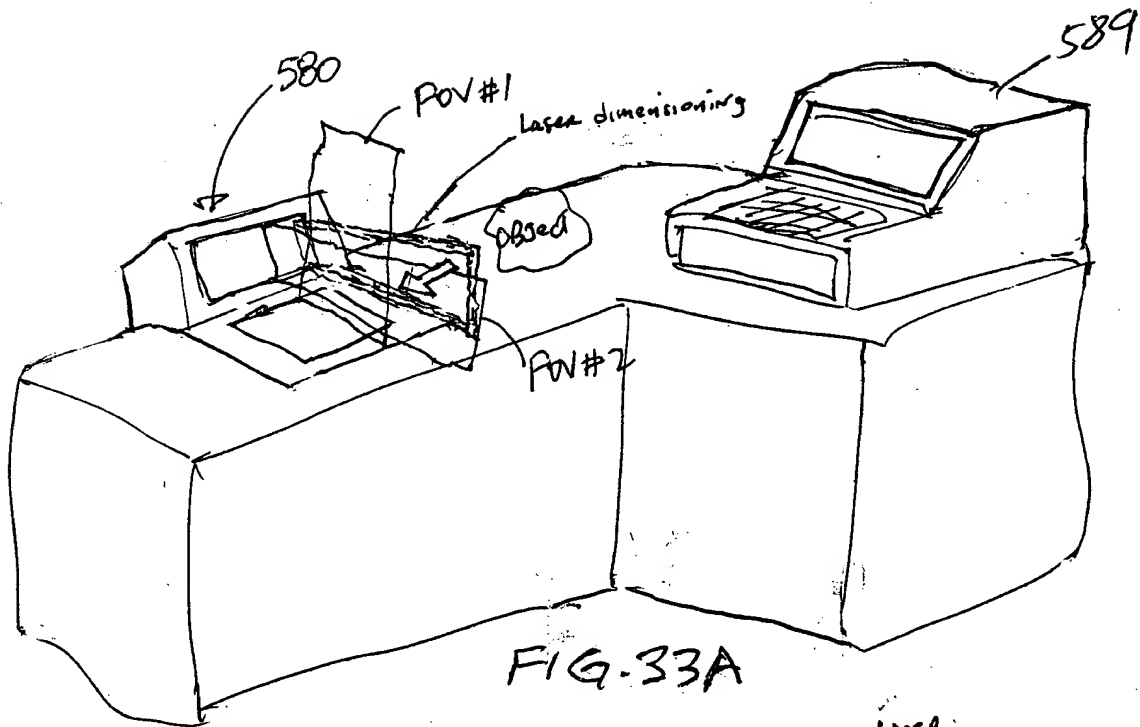
E

Master unit time-stamps received package identification data element, places said data element in a data queue, and processes package identification data elements and time-stamped package dimension data elements in said queue to link each package identification data element with one said corresponding package dimension data element.

F

FIG. 32B

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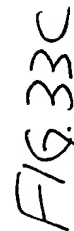


FIG. 33C

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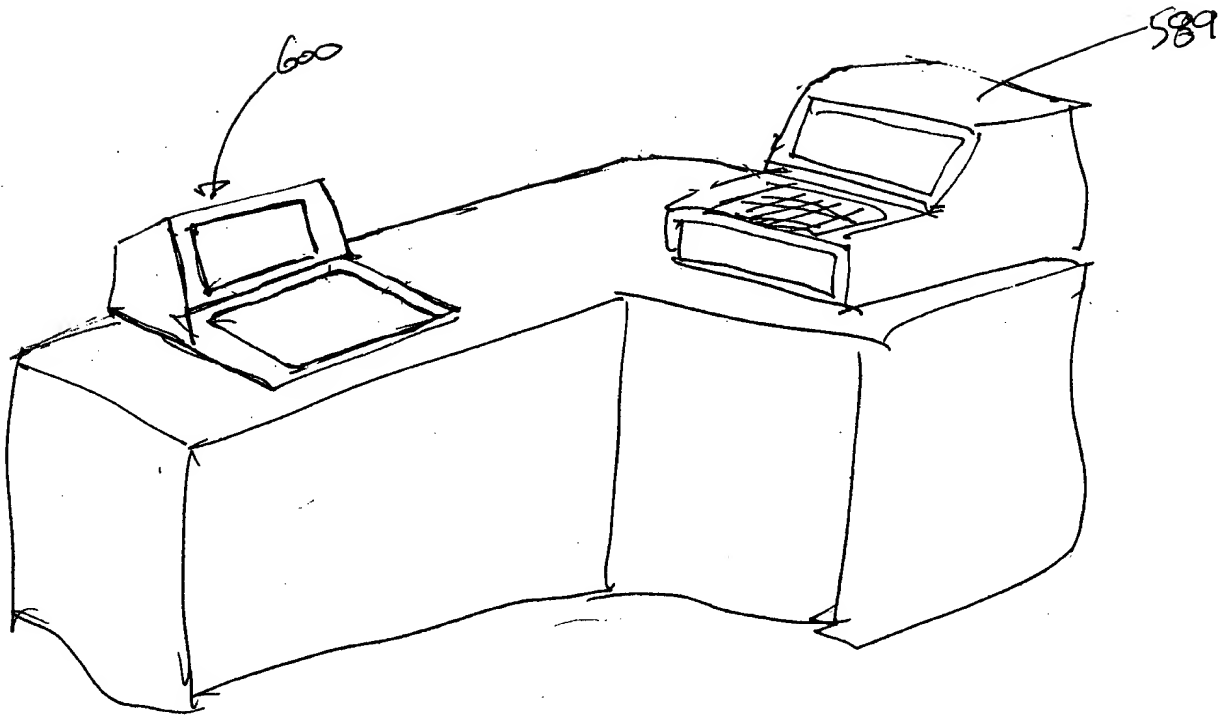


FIG. 34A

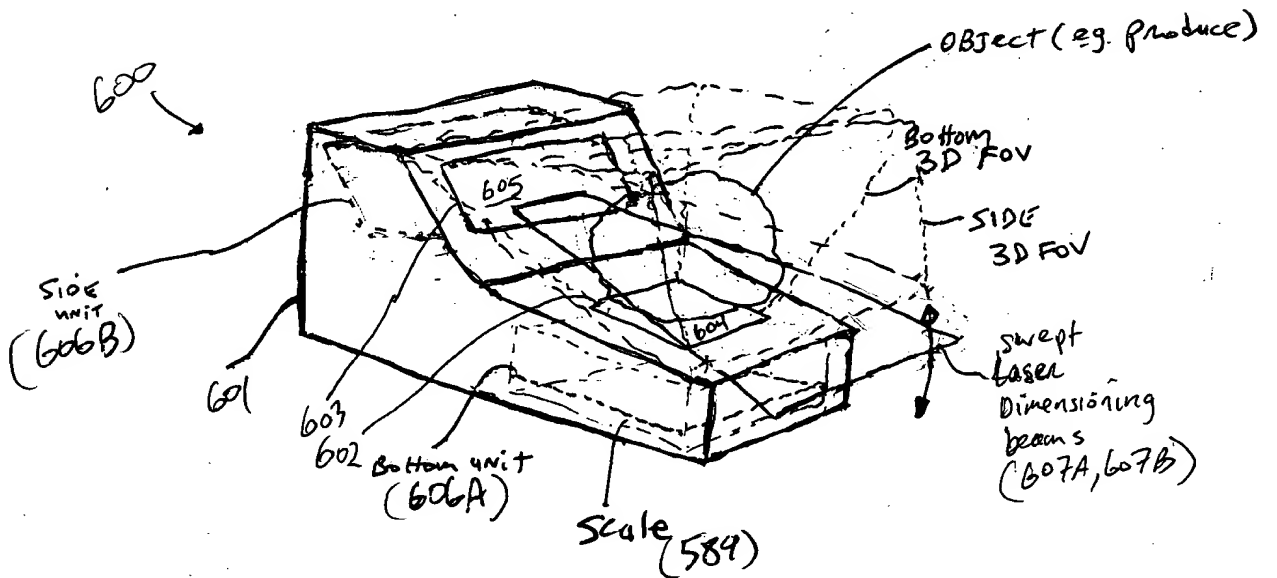
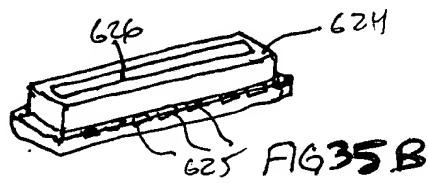
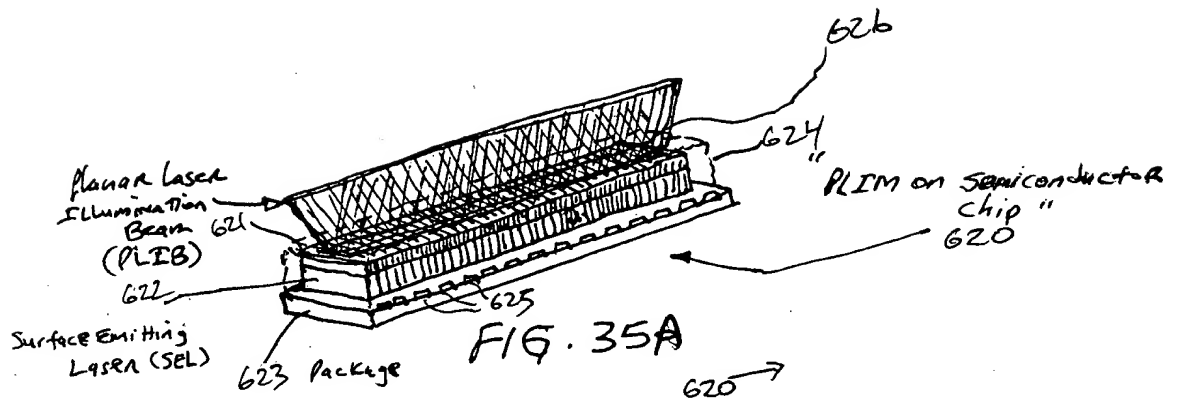


FIG. 34B



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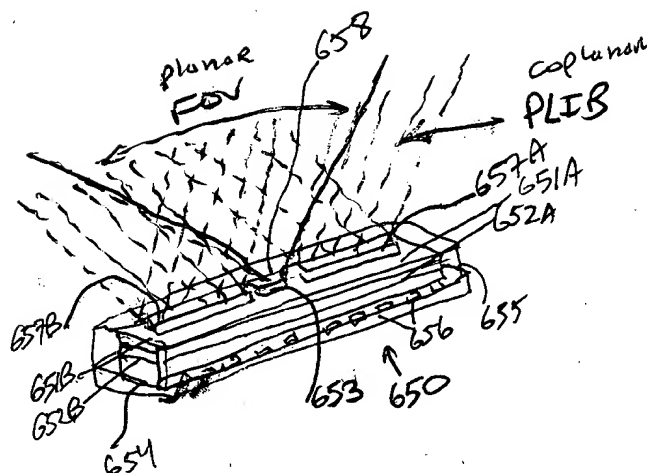


FIG. 37

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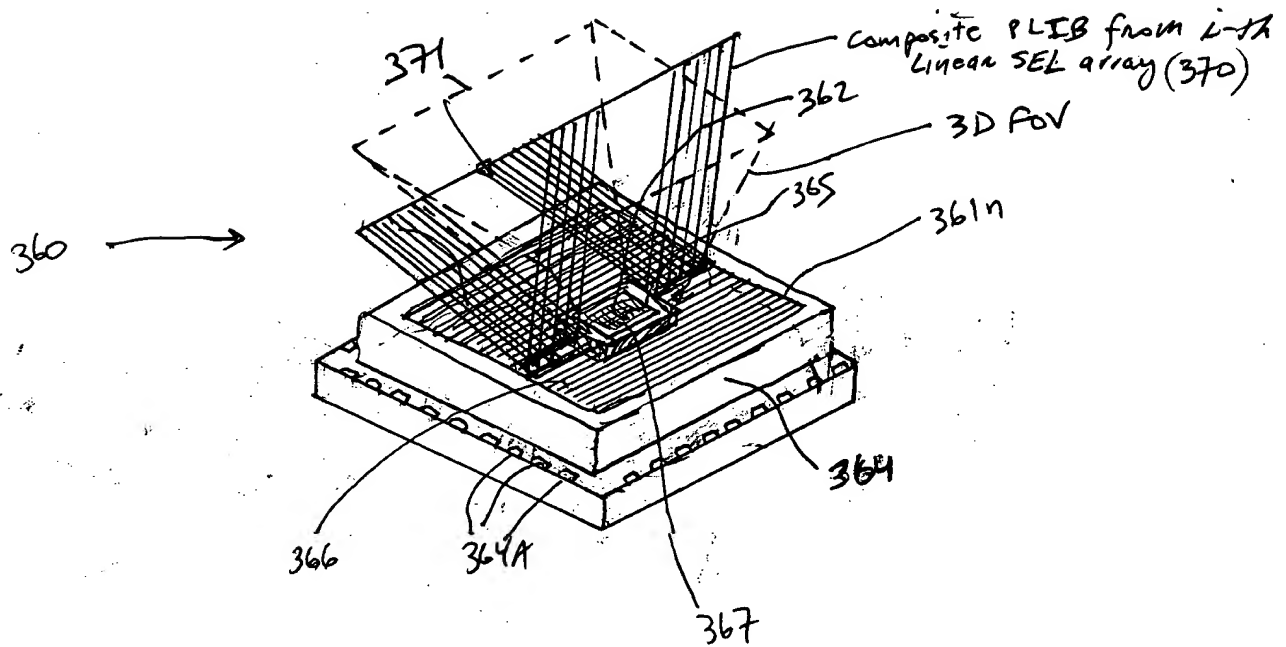


FIG. 38A

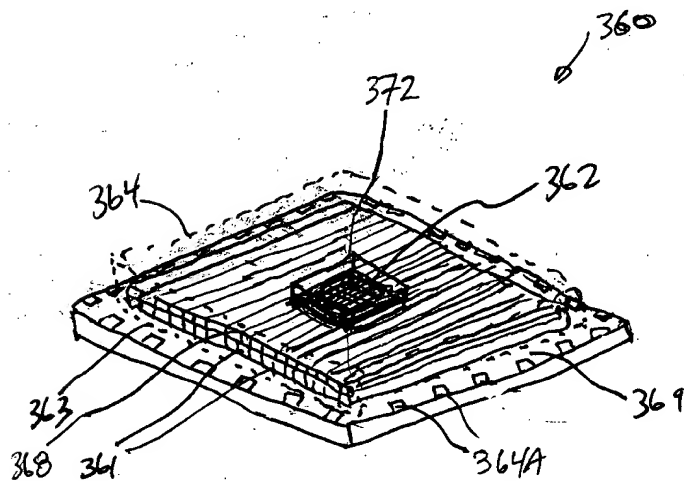


FIG. 38B